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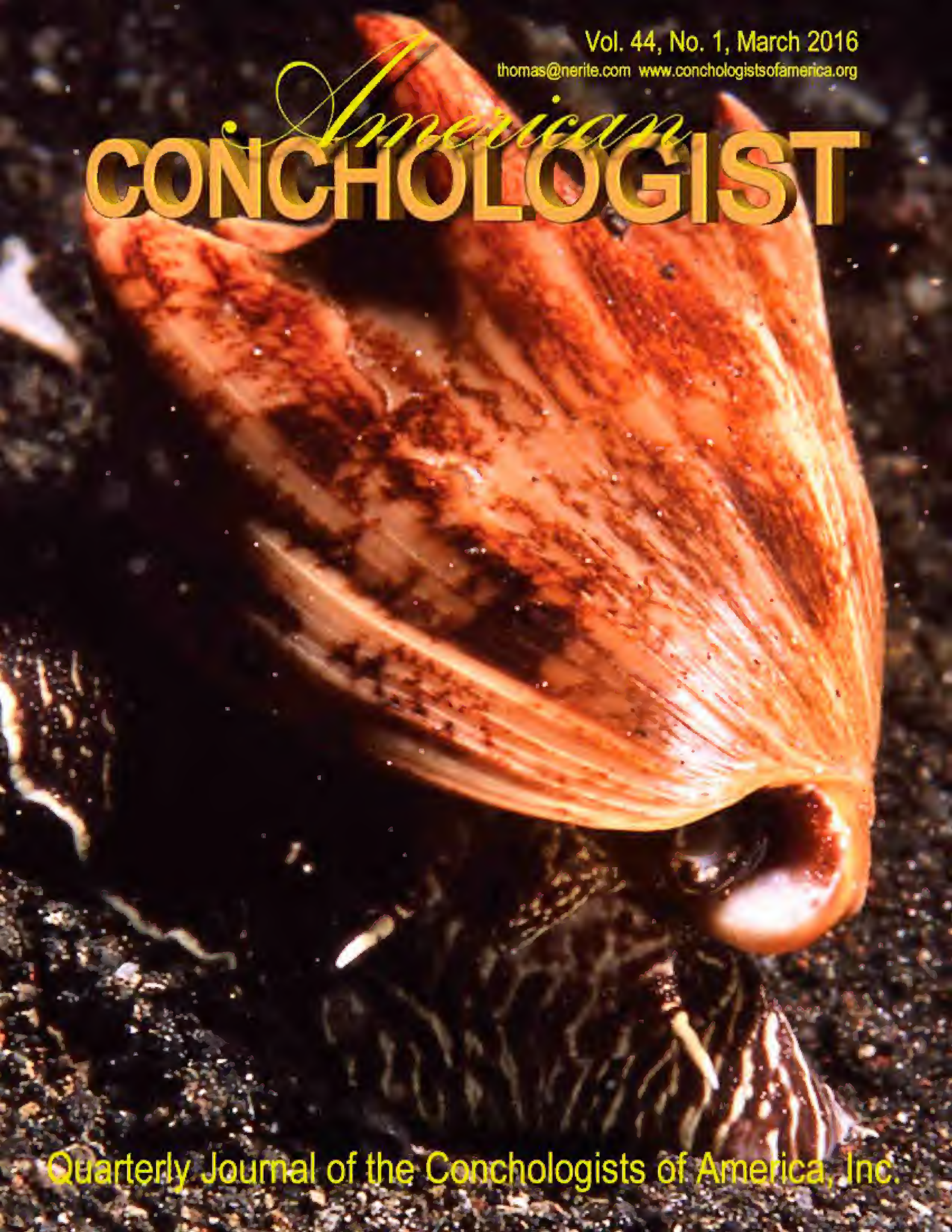

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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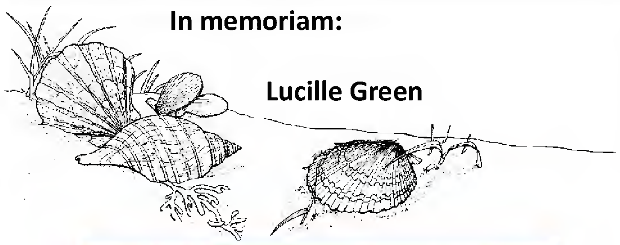
Cymbiola vespertilio (Linnaeus, 1758) at night in 40 feet of water on a black sand slope, Sulawesi, Indonesia. Photographed by COA contributor and author, Charles E. Rawlings, MD, JD. Charles has recently published a book of his molluscan photos, see review on page 36.

Back cover: Chicago!! Clockwise from top: Downtown Chicago, the Chicago Theatre, the 'L', Navy Pier, Millennium Park, the Field Museum, and the Sears Tower. This is an exciting place and a lot of your shelling friends will be there – COA Convention Chicago, 27-31 July 2016, at the Crowne Plaza in Rosemont, IL. The hotel is minutes from Chicago O'Hare International Airport and there is a free shuttle. Don't be left out. Fill out and mail in the forms that were in the last issue, or if they have mysteriously disappeared, go online to: www.conchologistsofamerica.org. Everything you need to register can be found there. Image from Wikipedia.com.

In memoriam:

Lucille Green



Clara Lucille Morrow Green, 71, passed away on Saturday, January 16, 2016 after a difficult battle with cancer. Lucille was born August 16, 1944, in Fort Worth, Texas. After graduating from Texas Christian University (TCU) in 1966, Lucille married David B. Green in 1967.

Lucille & David shared a common love for sea shells and were members of numerous shell clubs around the country, including The Central Florida Shell Club of Orlando where she served as President, 1989-1990. Lucille was the recipient of numerous major awards for scientific shell displays including The DuPont, given by the DuPont Museum of Natural Science of Wilmington, Delaware, and Best Exhibit Award, given by The Conchologist of America (COA). Lucille also received numerous awards for shell crafts and shell related needlework. She went on to serve on the Board of Directors for COA and was the COA Convention Chairman in Houston in 2000. She was also honored with the annual COA *Neptunea* Award for outstanding service in 2013.

A creative person, she enjoyed gardening, sewing, knitting, crochet, needlework, cooking, and entertaining friends and family. She was an avid collector of snail collectables and could usually be found wearing a snail pin on her blouse or jacket.

Lucille will be deeply missed by her family and friends.

The Turrids: not just LBJs[1]

Bruce Neville

When I get shell-bored, I pull out Eisenberg. This is a dangerous thing. Unlike any other shell book, Eisenberg shows lots of shells laid out in relative size, on a double-page spread. Although the names on the bottom half are getting more and more highlighted (highlit?), there are still and probably always will be plenty of holes. Occasionally, I'll decide that my collection is seriously underrepresented in an entire family, and I'll set out to remedy the situation. Such was the situation a few years ago with the "Turridae." Widely acknowledged as the largest family of shells, I had pitiful few representatives —certainly less than 1% of the named species!

Many shellers have little experience with the turrids. Historically, shell books have ignored them, portrayed them as unappealing "little brown jobs," or given long, daunting, unillustrated lists of names. Identification was generally "only for specialists." Generic names were confusing and often-changing. Few species are common in beach drift or shallow water. Until recently, only a few species were available from dealers. It's no wonder, then, that shellers shied away from this large and confusing family.

Popular shell books of the late twentieth century contributed to this neglect. The "Greatest Shell Book Ever Written," Abbott's *Seashells of the World*, portrayed only seven species on a two-page spread. His later *Seashells of North America* portrayed 18 species, still on a two-page spread, from a more limited geographic area. From the time I got that book, I coveted *Cochlespira radiata* (Dall 1889). Eisenberg crammed an amazing 43 worldwide species, still on a two-page spread, which was probably a fair representation of the species available through dealers at that time, as was his goal. The following year, Abbott and Dance, in their *Compendium of Seashells,* illustrated 75 species.

Comprehensive works of the time did little to help the popularity of the family. Abbott's *American Seashells* (second edition) lists 572 species and subspecies of turrid, but only 165 are illustrated, most with line drawings. Keen's monograph on the Panamic province lists 301 species and subspecies of turrid and illustrates nearly all, though many are reproductions of the type figures of varying quality. Poppe and Goto later listed 168 species from Europe, but only illustrated 54. Nordsieck described and illustrated 305 species from Europe, again with line drawings. Wilson, in his comprehensive work on Australian prosobranchs, lists only 76 species and illustrates only 63, from a fauna estimated by Kohn (in Beesley et al.) at >400 species.

Books that through time covered more and more turrids, but still only a fraction of the estimated 3,000+ species.

Fortunately, the situation has improved a bit in the twenty-first century. Williams's *Turridae of Florida and the Caribbean* lists and illustrates 301 taxa from that area, often with type specimens. Hasegawa et al. in Okutani illustrate 240 species from Japan, including many microspecies. Sysoev and Oliveira & Sysoev in Poppe illustrate 199 species from the Philippines. Although the illustrations in the latter are spectacular, they often do not substitute for the proverbial thousand words each.

So, how many species of turrid are there, really? The best answer was probably given by John K. Tucker in his *Catalog of Recent and Fossil Turrids*. No serious student of turrids can afford to be without this 1,295-page behemoth. Among the >11,350 species-group names listed, Tucker estimated that there were >3,000 potentially valid recent species in 2004, and more have been described almost every day since![2] Thanks to the development of online auctions and the increased popularity of the group, I've finally made it to the magical 1% mark, and actually passed the 10% mark!

So, what makes a turrid a turrid? There is no single defining character shared by all turrids or that excludes all other mollusks. Basically, they are any conoidean mollusk that is not a cone or an auger. Even that gets a little vague around the conorbids.

One feature that has been called characteristic of the turrids is the "turrid notch," an indentation for the exhalant siphon near the shoulder. This notch may be quite prominent and marked by a difference in sculpture, or it may be completely obscured. I often see it referred to in a description and wonder what the author has been smoking. The "turrid notch" is also the source of the old name for the group, *Pleurotoma* Lamarck 1799, meaning lung-slit. This feature is, of course, not unique to the turrids. The cones also show an "anal notch" to varying degrees, though it is generally immediately adjacent to the suture in the cones and set off from the suture to some degree in the turrids.

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[1] Little brown jobs (to borrow a phrase from the birding world).

[2] Note that I'm using the old, broad concept of the "Turridae" in this first part of the article. I'll get to recent developments in the taxonomy of the group later.

The radula varies from 5 teeth per row to 4, 3, or 2, to 0. In the most primitive condition, there are five teeth per row and a well-developed radular membrane. The full complement of teeth is a small central (or rachidian) tooth, two laterals, and two marginals. This arrangement occurs in the drilliids. The lateral teeth are generally lost first, leaving a configuration of three teeth per row. Alternatively, the central tooth may rarely be lost, leaving four teeth per row, two vestigial laterals, and two marginals, as happens in some *Crassispira* species. Finally, the central or lateral teeth are lost, leaving only the two marginals. The radula has been completely lost in some species of raphitomids. As the radular teeth are lost, the radular membrane and odontophore also regress and finally disappear. Throughout the broad diversity of the group, each type of tooth can occur in several different forms. The marginal teeth show the greatest diversity of structure in the family. They are divided by Taylor et al. (1993) into three main classes, solid, "wishbone" or duplex, and hollow, each with several subclasses. It is the hollow marginals that are the venomous "harpoons" of the cones, augers, and many turrids.

Some genera have an operculum, while others do not. When present, the operculum is horny. It may fill the aperture completely or be vestigial. As may be expected in a group with >3,000 species, shell shape, size, and sculpture vary spectacularly. In length, the species vary from *Carinapex minutissima* (Garrett 1873) with an adult size of just a couple millimeters to *Turris crispa* (Lamarck 1816) with a maximum recorded size of 178.37 mm (Quiquandon 2015). The colors are generally variations of browns, tans, creams, and whites, but purples, reds, and other colors can occur. Sinistrality occurs naturally in a few genera (e.g., *Antiplanes* Dall 1902, *Scaevatula* Gofas 1989, *Asthenotoma* Harris & Burrows 1891), often alongside dextral species. Harry Lee reports reverse coiling in two recent species of turrids, *Asthenotoma lamothei* (Dautzenberg 1910) and *Clionella borni* (E.A. Smith 1877), at http://www.jaxshells.org/reverse.htm.

What do we know of their biology? Frankly, very little. They are found in all seas at all depths. Apparently all are carnivorous. Where the diet is known, most species have been found to feed on worms, generally polychaetes. A few species have been observed feeding on mollusks. They do have a poison gland, like other conoideans. A few species are now being studied for their toxins. The poison apparatus has been secondarily lost in some groups, such as the strictispirids and some raphitomids. The sexes are separate and fertilization is internal. Eggs are laid in capsules that are adherent to the substrate.

Any recounting of modern classification must begin with Linnaeus. He described three species of turrid, though he did not recognize them as such: *Murex babylonius*, now *Turris babylonia* (Linnaeus 1758); *Murex javanus*, now *Turricula javana* (Linnaeus 1758); and *Strombus lividus*, now thought to be *Clavatula auriculifera* Lamarck 1816. The name *Turris* was validly erected by Röding in 1798.[3] He included 22 names under the genus, all of which are either synonyms of Linnaeus's names or *nomina nuda*. Lamarck added two genera, *Pleurotoma* Lamarck 1799 and *Clavatula* Lamarck 1801. By 1822, there were 23 living and 30 fossil species of *Pleurotoma*. Röding's *Museum Boltenianum* was, of course, rare and overlooked even in Europe during the eighteenth century, and Lamarck's names were in general use. It was not until Dall resurrected the *Museum Boltenianum* in 1906 that Röding's *Turris* was given precedence, though the furor over the loss of the familiar Lamarckian names lasted for over half a century. Only eight genus-group names had been erected for the turrids by 1850. There were 65 genus-group names in the family by 1900. The naming of genera has accelerated rapidly since 1900 and has not slowed since. Although he didn't treat genus-group names, Tucker estimated that there were more that 350 valid genera.

Traditionally, the turrids were a catch-all family for any conoidean gastropod that wasn't a cone or an auger. Species continued to be described, but there were no true specialists in the group. Species were transferred readily between genera, and genera were transferred just as readily between subfamilies. It was widely acknowledged that the turrids were not a natural group, i.e., the family did not contain all the descendants of a common ancestor and only those descendants, but nobody quite knew how to deal with them. Powell (1966) provided the first comprehensive treatment of the family, recognizing nine subfamilies, which eventually became 17, in an arrangement that was widely used for many years.

In 1993, Taylor, Kantor, and Sysoev sampled a large number of "turrids" and, based primarily on radular characters and feeding apparatus, proposed a six-family arrangement for the conoideans: Drilliidae, Terebridae, Pseudomelatomidae, Strictispiridae, Turridae (with 5 subfamilies), and Conidae (including 6 "turrid" subfamilies). All of a sudden, the familiar "Conidae" became swamped with turrids! Cone-purists were outraged! This arrangement, however, recognized that the cones, for all their popularity, are just specialized turrids, nestled within the great assemblage of other turrids. The arrangement also went a long way toward reducing the paraphyly (non-naturalness) of the group. This was the system used by Turgeon et al. in the second edition of their *Common and Scientific Names of Mollusks*. With the addition of the Clavatulidae, this is also the arrangement adopted by Bouchet & Rocroi in their *Nomenclator of Gastropod Families* in 2005.

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[3] The name *Turris* has recently been attributed to Batsch 1789, but Batsch's concept of the name did not include the species now included in the genus and the subsequent type designation is an erroneous reversal of precedence and therefore invalid.

When Tucker and Tenorio published their masterful revision of the more restricted conoidean gastropods in 2009, they split the former Conidae (in the former, restricted sense, plus a few "turrids") into five families. By doing so, the other subfamilies previously included by Taylor et al. in the Conidae were automatically also elevated to family status. The subfamilies in Taylor et al's concept of Turridae were similarly distinct and also needed to be elevated to the rank of family. Since that time, four of Tucker and Tenorio's families have been re-lumped back into the Conidae, with Conorbidae remaining a distinct family. Kantor et al., in 2012, erected a new family for the single species *Bouchetispira vitrea* Kantor, Strong & Puillandre 2012. This brings the total number of currently recognized families in the former "Turridae" to 14. The current phylogenetic arrangement of the conoidean families is:

Drilliidae
Pseudomelatomidae
Strictispiridae
Clavatulidae
Horaiclavidae
Cochlespiridae
Turridae (s.s.)
(Conidae)
Conorbidae
Borsoniidae
Clathurellidae
Mitromorphidae
Bouchetispiridae
Mangeliidae
Raphitomidae
(Terebridae)

But enough of my ramblings. I started out by saying that turrids are more than just "little brown jobs." Let the pictures speak for themselves. Marcus Coltro of Femorale provided the many excellent photographs of the turrids (s.l.) that I used in an earlier presentation that was the basis of this article. It is with his renewed permission that I re-use the photos to demonstrate that turrids can be downright attractive and worthy of any sheller's attention. Thank you, Marcus.

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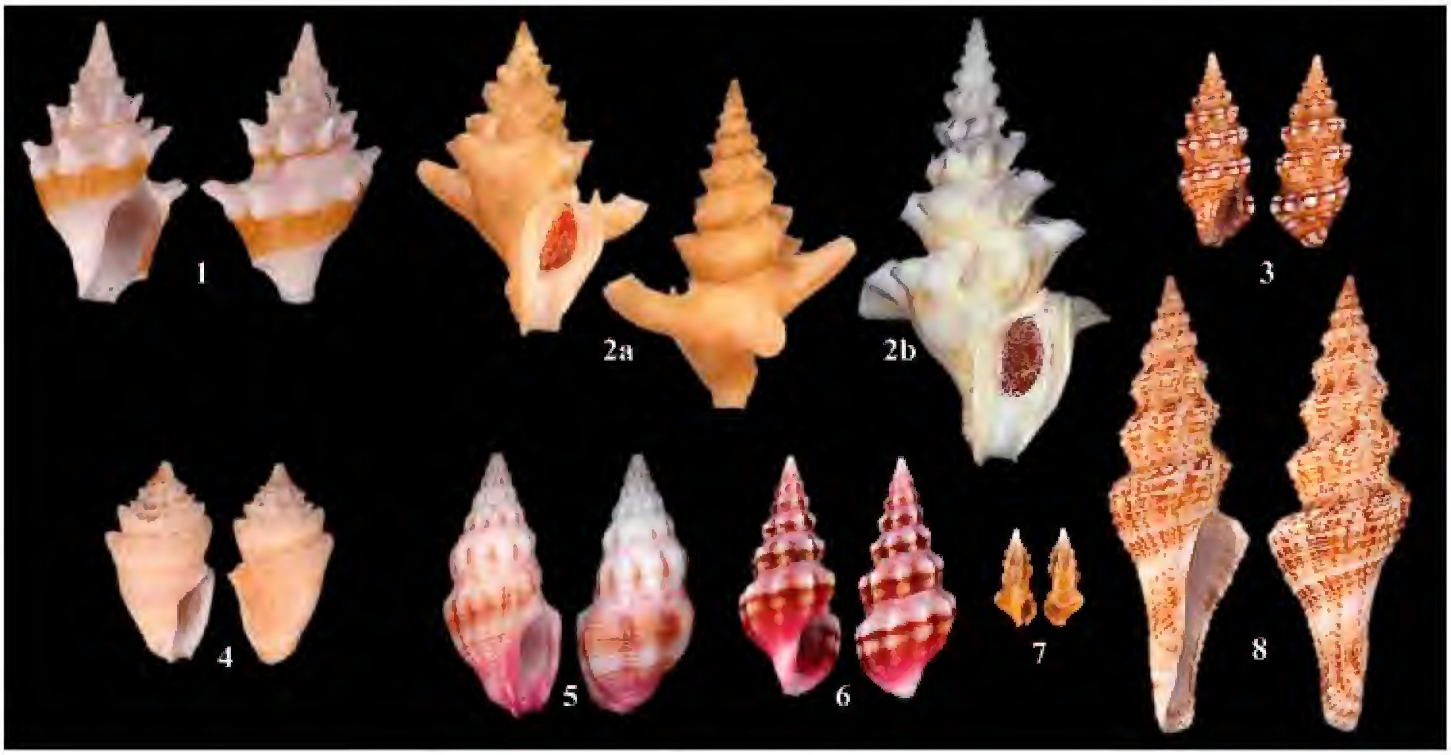
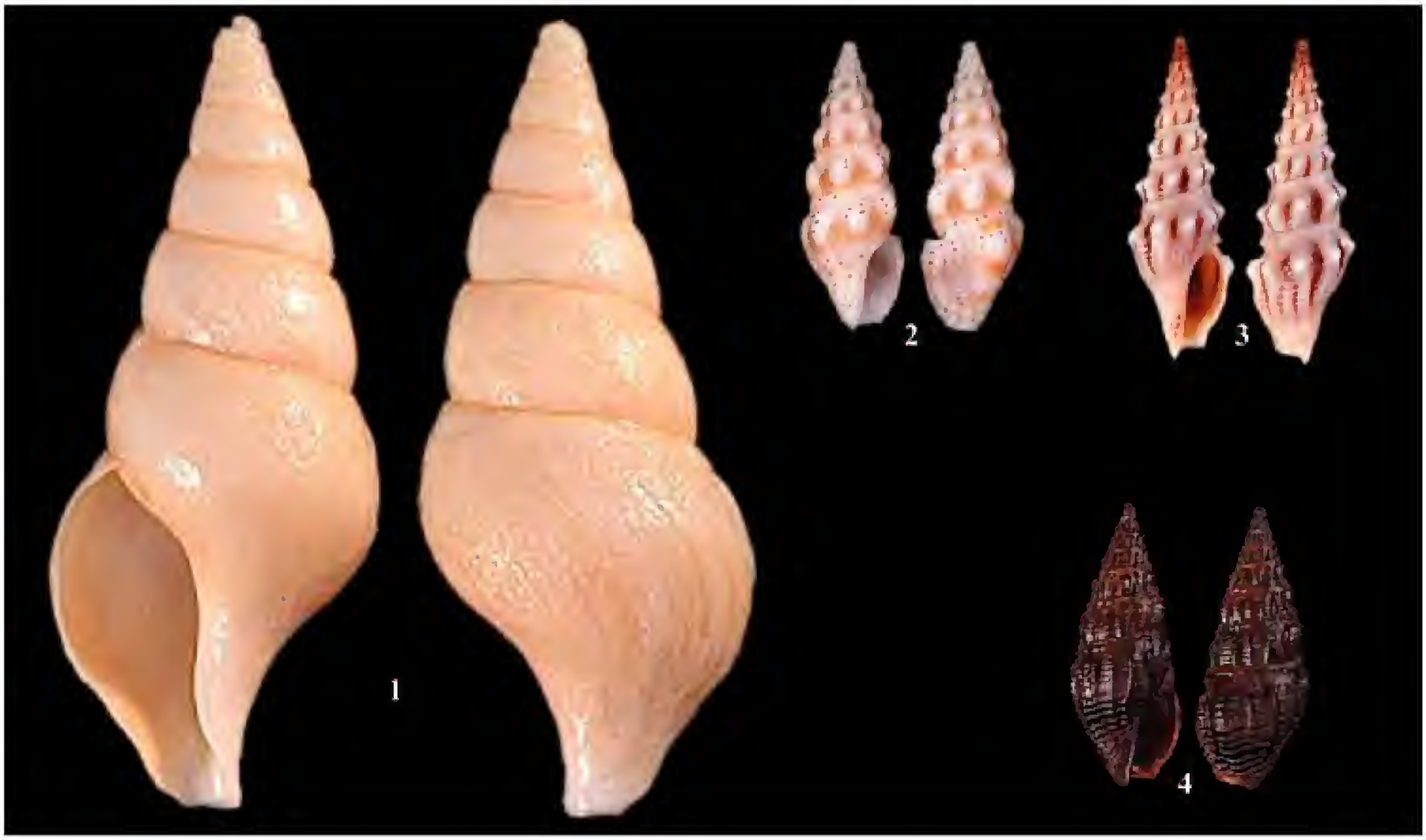


Drilliidae (Copyright Femorale, used with permission)

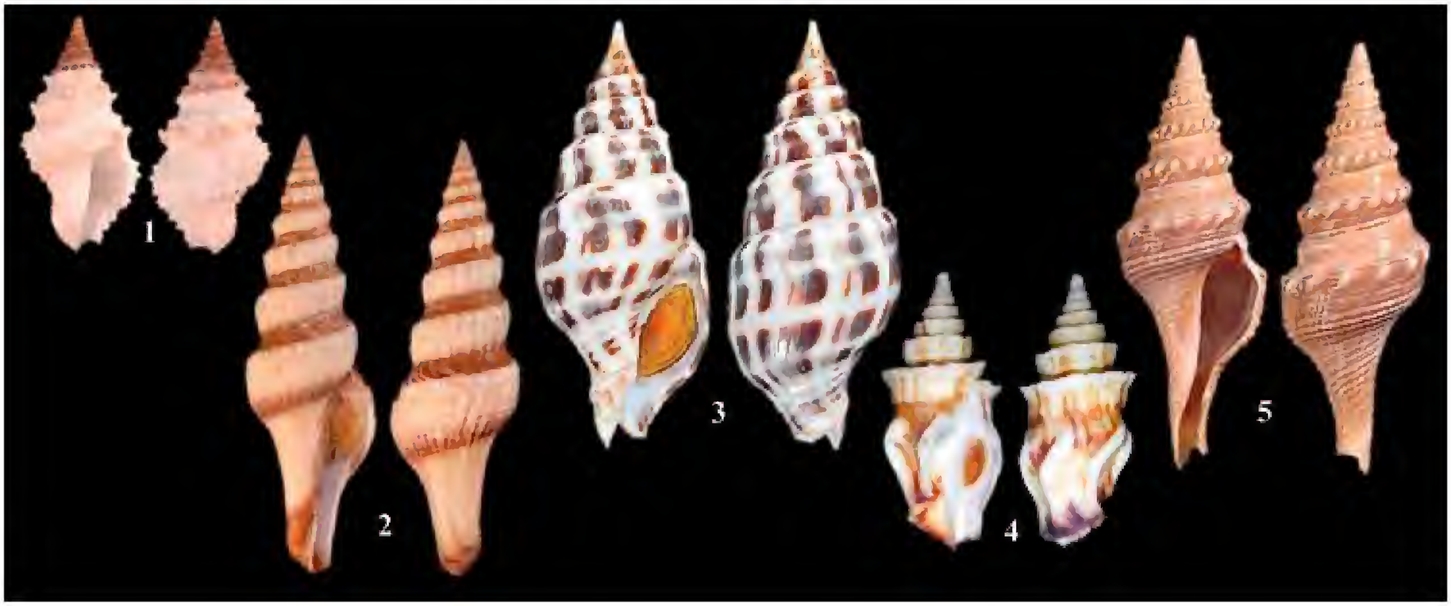
1. *Clavus canicularis* (Röding 1798), 20.5 mm, Seragaki, Okinawa, Japan. 2a-b. *Clavus johnsoni* (Bartsch 1934), 31-41.5 mm, north of San Juan, Puerto Rico. 3. *Clavus lamberti* (Montrouzier 1860), 15.1 mm, Nacala Bay, Mozambique. 4. *Conopleura striata* Hinds 1844, 15 mm, Senkaku Islands, Okinawa. 5. *Drillia idalinae* P. Bernard & Nicolay, 1984, 22 mm, Lago Azul, São Tomé Island. 6. *Fenimorea halidorema* Schwengel 1940, 18.8 mm, Roatan Island, Honduras. 7. *Plagiostropha quintuplex* Melvill 1927, 8 mm, Zamboanga, Philippines. 8. *Fusiturricula jaquensis* (G.B. Sowerby I 1850), 38.7 mm, off Cartagena, Colombia.



Pseudomelatomidae (1-3) & Strictispiridae (4) (Copyright Femorale, used with permission)

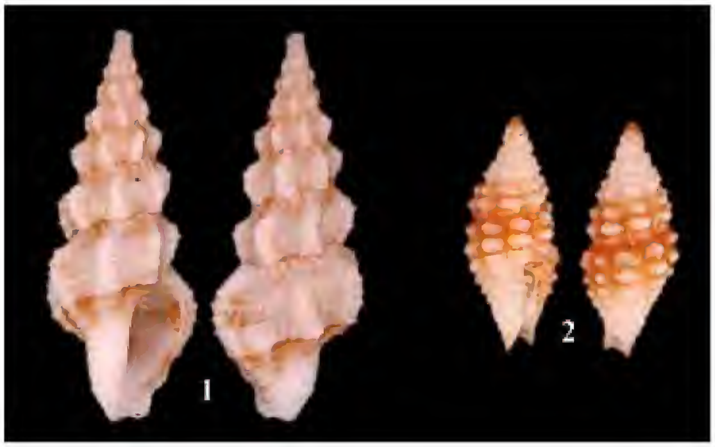
1. *Antiplanes contraria* (Yokoyama 1926), 45.3 mm, Mobetsu, Hokkaido, Japan. 2. *Crassispira pulchrepunctata* Stahlschmidt & Bozzetti 2007, 13 mm, off Panglao, Philippines. 3. *Inquisitor solomonensis* (E.A. Smith 1876), 16.2 mm, Honiara, Guadalcanal.

4. *Strictispira coltrorum* Tippett 2006, 14.4 mm, Barra Beach, Salvador, Brasil.



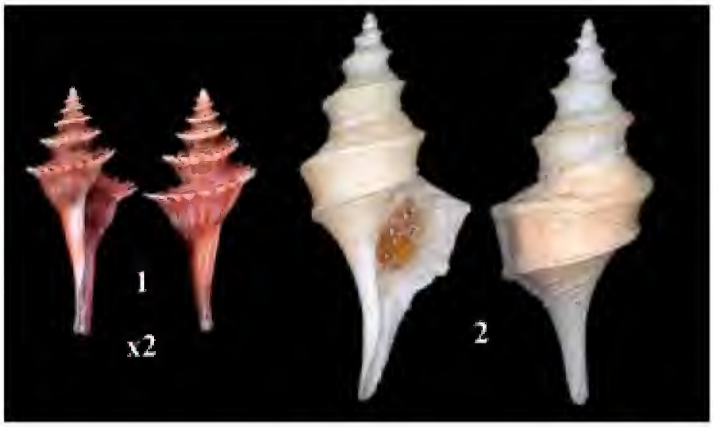
Clavatulidae (Copyright Femorale, used with permission)

1. *Clavatula muricata* (Lamarck 1822), 26.4 mm, off Freetown, Sierra Leone. 2. *Fusiturris similis* (Bivona 1838), 52 mm, Málaga, Spain. 3. *Pusionella nifat* (Bruguière 1792), 52 mm, Luanda, Angola. 4. *Toxiclionella elstoni* (Barnard 1963), 35.6 mm, off Transkei coast, South Africa. 5. *Turricula javana* (Linnaeus 1758), 52.2 mm, Java, Indonesia.



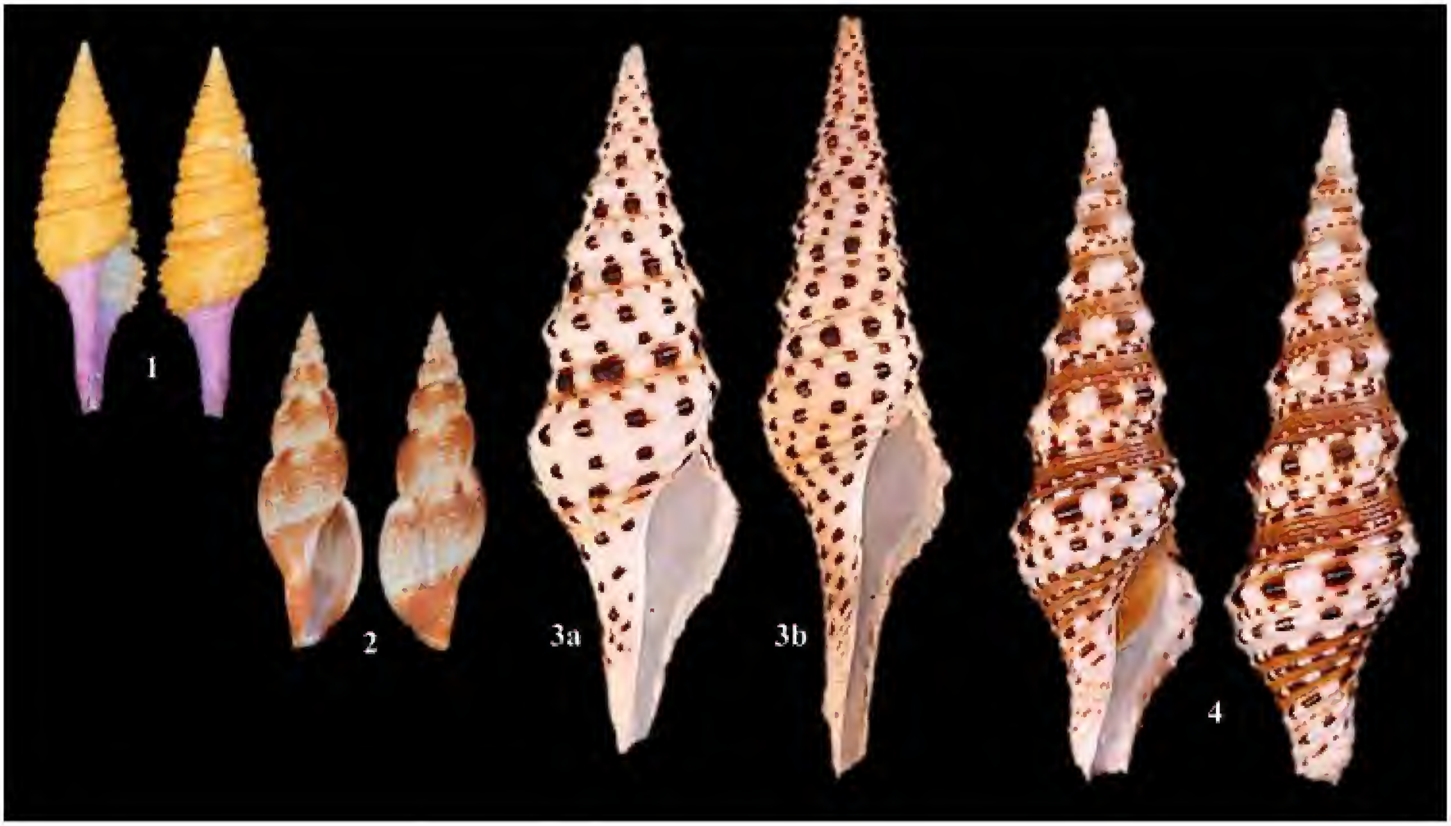
Horaiclavidae
(Copyright Femorale, used with permission)

1. *Buchema buccooensis* (Nowell-Usticke 1971), 14.7 mm, Archipelago de San Blas, Caribbean side, Panama. 2. *Carinapex papillosa* (Garrett 1873), 4.7 mm, Puako, Big Island, Hawaii.



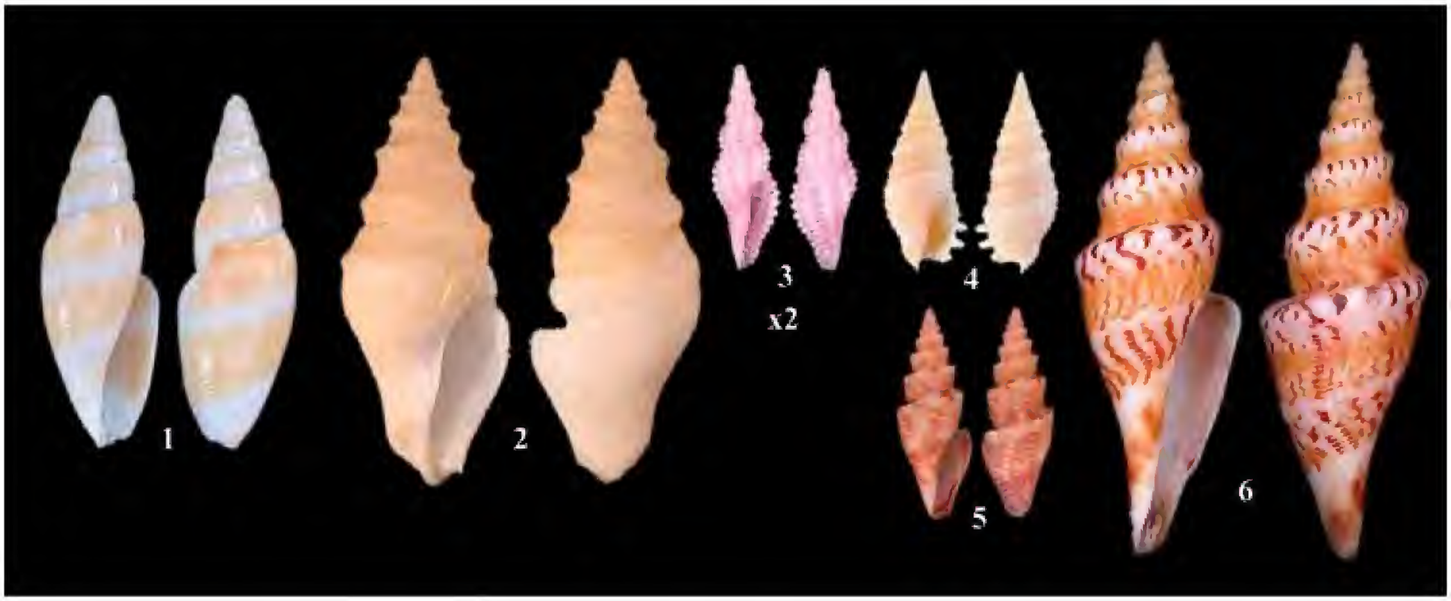
Cochlespiridae
(Copyright Femorale, used with permission)

1. *Cochlespira radiata* (Dall 1889), 23 mm, La Guaira, Colombia. 2. *Aforia multispiralis* Dell 1990, 73 mm, off Antarctic Peninsula.



Turridae (Copyright Femorale, used with permission)

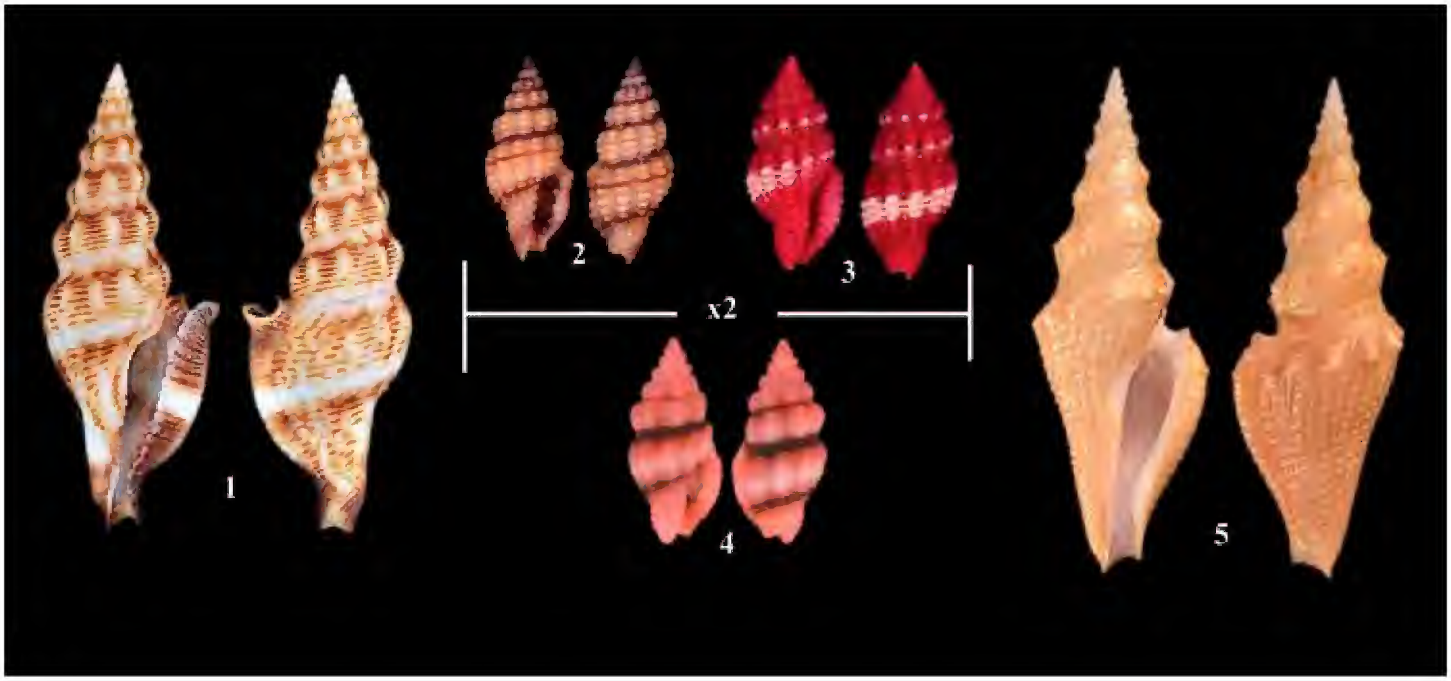
1. *Gemmula concinna* (Dunker 1856), 33.7 mm, Kota Kinabalu, Sabah, Malaysia. 2. *Maoridaphne* cf. *M. subula* (Reeve 1845), 28.7 mm, off Lu Tao, Taiwan. 3a. *Turris chaldea* Kilburn, Fedosov & Olivera, 2012 (until recently thought to be a form of *T. babylonia*). 3b. *Turris babylonia* (Linnaeus 1758), 72 mm (elongate form), Panglao, Philippines. 4. *Turris spectabilis* (Reeve 1843), 63.7 mm, Lua'ofa Island, Vava'u, Tonga.



Conorbidae (1) & Borsoniidae (2-6) (Copyright Femorale, used with permission)

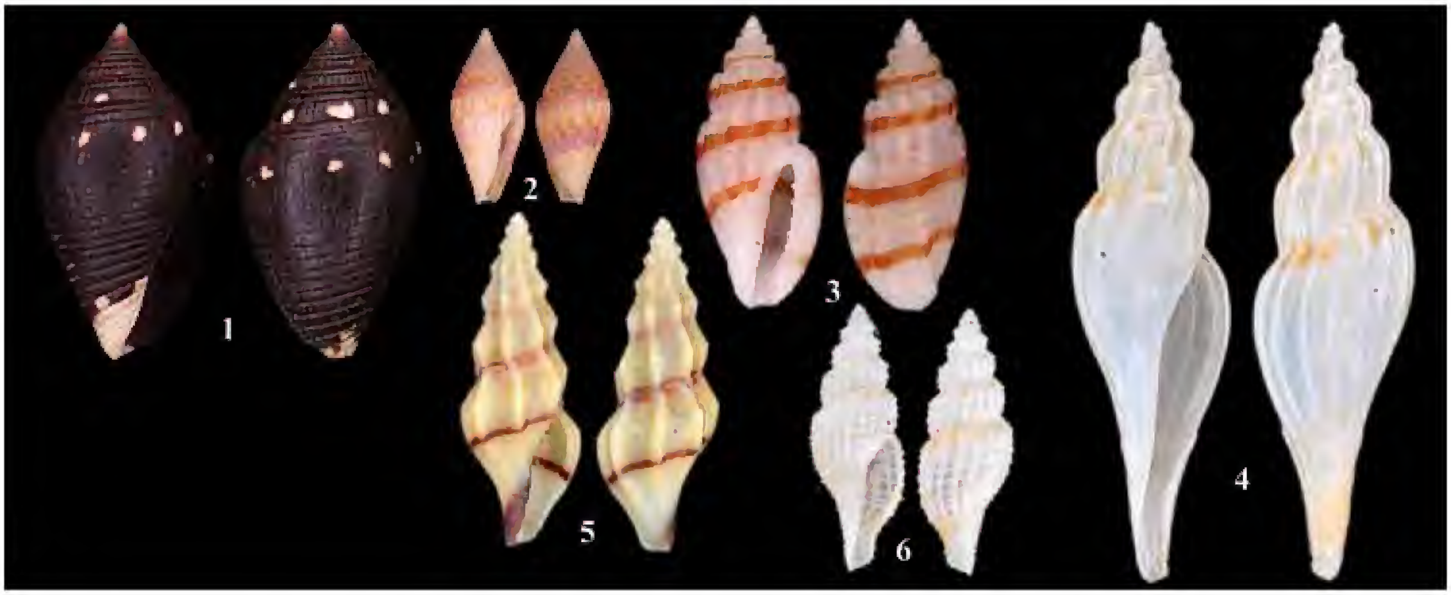
1. *Benthofascis pseudobiconica* Tucker, Tenorio & Stahlschmidt 2011, 36 mm, Sandy Cape, Queensland.

2. *Bathytoma prodicia* Kilburn 1978, 47 mm, off Maputo, Mozambique. 3. *Diptychophlia hubrechti* Cunha 2005, 8 mm, Canopus Bank, 120 miles off Ceará, Brasil. 4. *Tomopleura makemonos* (Jousseaume 1883), 19.5 mm, Muscat, Oman. 5. *Tropidoturris fossata notialis* Kilburn 1986, 19 mm, off Durban, Natal, South Africa. 6. *Zemacies excelsa* Sysoev & Bouchet 2001, 58.2 mm, North Surprises Islands, New Caledonia.



Clathurellidae (Copyright Femorale, used with permission)

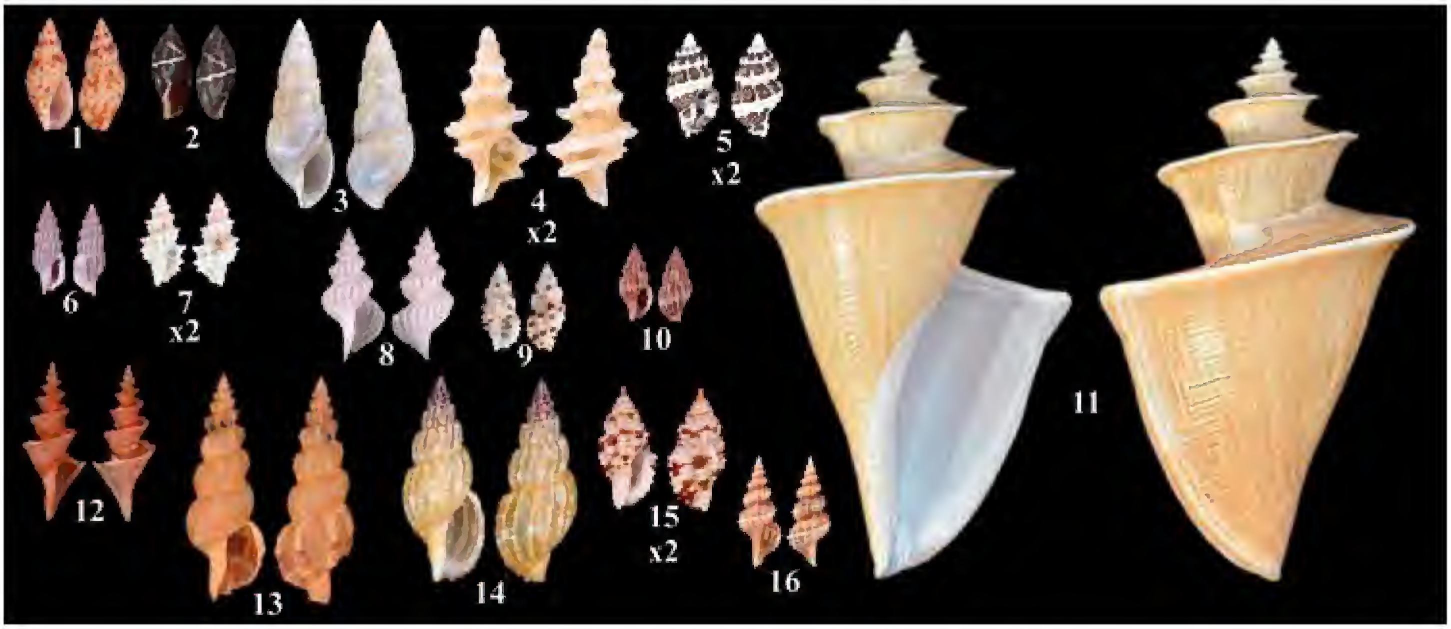
1. *Glyphostoma otohimeae* Kosuge 1981, 32.2 mm, off Lu Tao, Taiwan. 2. *Lienardia mighelsi* Iredale & Tomlin 1917, 6 mm, Niuatoputapu, Tonga. 3. *Lienardia rubicunda* (Gould, 1860) 5mm, Taiwan. 4. *Lienardia rubida* (Hinds 1844), 6.9 mm, Zamboanga, Philippines. 5. *Strombinoturris crockeri* Hertlein & Strong 1951, 41 mm, Cebaco Island, Pacific Panama.



Mitromorphidae (1-2) & Mangeliidae (3-6) (Copyright Femorale, used with permission)

1. *Lovellona atramentosa* (Reeve 1849), 10.4 mm, Toau, Tuamotus, French Polynesia. 2. *Mitromorpha alphonsiana* (Hervier 1900), 4.9 mm, Hospital Point, Guam.

3. *Eucithara celebensis* (Hinds 1843), 8.2 mm, Port Vila, Efaté, Vanuatu. 4. *Ithycythara cymella* (Dall 1889), 21.1 mm, off Marie Pampeon, Curaçao. 5. *Kurtziella antiochroa* (Pillsbry & Lowe 1932), 9.1 mm, Solango Island, Manabí, Ecuador. 6. *Tenaturris decora* (E.A. Smith 1882), 6.2 mm, Bocas del Toro, Caribbean Panama.



Raphitomidae (Copyright Femorale, used with permission)

1. *Daphnella margaretae* Lyons 1972, 11.8 mm, off Alcobaça, Brasil. 2. *Daphnella olyra* Reeve 1845, 11 mm, Santa Rosa Island, Cebu, Philippines. 3. *Eubela nipponica* Kuroda 1938, 18.2 mm, Sagami Bay, Honshu, Japan. 4. *Eucyclotoma tricarinata* (Kiener 1840), 7.2 mm, Sand Island, Oahu, Hawaii. 5. *Hemilienardia ocellata* (Jousseaume 1888), 3 mm, Taiwan. 6. *Kermia lutea* (Pease 1860), 7.7 mm, Seragaki, Okinawa. 7. *Microdaphne morrisoni* Rehder 1980, 4.1mm, Hawaii. 8. *Pleurotomella* sp., 13.3 mm, off Cabo Frio, Rio de Janeiro State, Brasil. 9. *Pseudodaphnella tincta* (Reeve 1846), 7 mm, Niuatoputapu, Tonga. 10. *Raphitoma bicolor* (Risso 1826), 6 mm, Mijas, Malagá, Spain. 11. *Thatcheria mirabilis* (Angas, 1877), 72.1 mm, off Keelung, Taiwan. 12. *Thatcheriasyrinx orientis* (Melvill 1904), 11.6 mm, off Kagoshima, Japan. 13. *Tritonoturris amabilis* (Hinds 1843), 30.5 mm, Kota Kinabalu, Sabah, Malaysia. 14. *Tritonoturris cumingii* (Powys 1835), 23 mm, Nacala area, Mozambique. 15. *Truncadaphne chrysoleuca* (Melvill 1923), 5.7 mm, off San Blas, Caribbean Panama. 16. *Veprecula arethusa* (Dall 1918), 12.5 mm, off Lu Tao, Taiwan.

Cone Shells: Mumblings 36-plus years later

Jerry G. Walls

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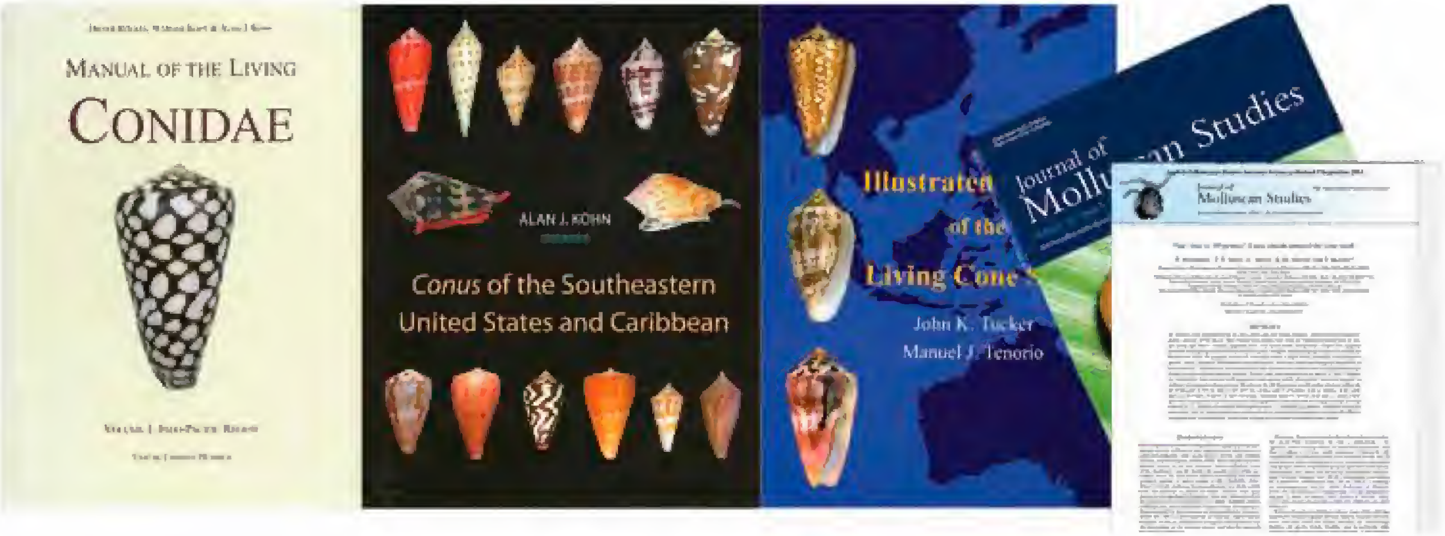
On March 6, 1979, I put into the mails the first copies of my new book, *Cone Shells, a Synopsis of the Living Conidae*. It's hard to believe that over 36 years have passed since I was able to put away my files and specimens used for that undertaking and move on to different areas. Only two shell books were still to be published by T.F.H. Publications in the next year or two (*Conchs, Tibias, and Harps* as well as the little *Shell Collecting*), and soon after I was mostly out of shell collecting. The cone book was written in about 18 months of nights and weekends between 1975 and 1977, with several trips to the Delaware Museum, followed by almost two years of waiting for actual publication. (See Crnkovic, 2008, for more information on *Cone Shells*, *The Pariah*, and other projects of this period.)

The past few years have seen a flurry of publications dealing with cone shell identification and relationships, with a few good regional books and even a new attempt to illustrate all the described species (see Tucker and Tenorio, 2013). There also has been considerable study of the molecular genetics of cones, mostly involving venoms and mitochondrial DNA (see Puillandre, et al., 2015, for a summary). Though I no longer actively collect cones (cowries, olives, and a few miscellaneous families are now my thing when I have time and money to spare), I try to keep some contact with the cone literature. Recently I had occasion to look up something in *Cone Shells*, and it started me thinking how the Conidae and my old book have fared over the years.

First, it is amazing to me that after all these years, *Cone Shells* remains the only book to attempt to both illustrate and describe in a systematic way all the cones, including variations. Recent books have tried to illustrate all the species, but without comparative descriptions that could be used to actually identify a cone. Additionally, the concept of a "valid" species has become pretty much the same concept as a "validly-named" species; they are not the same by a long shot, but this is not always obvious in the current literature. Unfortunately, the old "just look at the picture" concept of identification does not work well with cones (or most other shells, for that matter). Because cones are so variable in color, pattern, and shape, just looking at a picture of a single specimen, such as the holotype or name-bearer for the species, does not really give you an idea of what a cone species really represents. Collecting by picture matching really does become just another version of stamp or coin collecting, putting a name rather than an animal in a box on a specimen tray.

Second, though the number of species of cones recognized continues to increase at a phenomenal rate – from the roughly 310 species and an additional 100 or so subspecies/named forms I recognized in 1979 to certainly over 800 "valid" (= validly-named) species today – the quality of the descriptions remains generally low. Few new names are compared in a meaningful way with basic species, there is almost no consideration of variation, and (surprisingly) a tendency has developed to recognize species by size. I've noticed more and more species described because all specimens are, say, over 70mm, while those of the closest species are under 60mm, or the new species is under 25mm, while similar forms are 50mm long. Has everyone forgotten that cones start small and grow, often changing their pattern and shape as they become mature and then senile? I certainly thought that after all these years there would be more de-


MANUAL OF THE LIVING
CONIDAE
ALAN J. KOHN
Conus of the Southeastern United States and Caribbean
Illustrated Catalog of the Living Cone Shells
John K. Tucker
Manuel J. Tenorio
Journal of Molluscan Studies

Left to right: 1. Röckel, Korn, & Kohn (1995), *Manual of the Living Conidae.* Vol. 1: Indo-Pacific Region [subsequent volumes never materialized, although], 2. Alan Kohn (2014) did publish Conus *of the Southeastern United States and Caribbean*. These first two books use a single genus, *Conus*, for 316 and 53 species respectively. 3. Tucker & Tenorio (2013), *Illustrated Catalog of the Living Cone Shells*" **recognizes 119 genera for almost 750 cone species. 4. Puillandre, Duda, Meyer, Olivera & Bouchet (2015) One, four or 100 genera? A new classification of the cone shells. *Journal of Molluscan Studies*, recognize 803 cone species in 4 genera and 71 subgenera.**

scriptions of cone juveniles and growth stages in the literature, but they are strangely still almost absent.

Third, the use of mitochondrial DNA and radular tooth studies has led to absolute confusion in cone genera and even families. Utilizing the same basic information, which is constantly increasing, classifications recognize one family or five for the cones and anything from four genera to over 120 genera (with more described each year). Is any of this an improvement over recognizing just a single family Conidae with a single living genus, *Conus*, as was considered proper for so long? Certainly from the viewpoint of a collector, having literally dozens of generic names to pick through when looking for a species is discouraging and can lead to leaving the hobby. Puillandre, et al., 2015, give a listing of 803 "valid" species and their current classification into four genera and 71 subgenera (often almost guesswork) – now considered a conservative classification. Of course, the scientific work is being done not for collectors but for scientists, who are more interested in supposed relationships than taxonomy, which has to deal with making identifications that everyone can use. The scary part is that when DNA studies move to nuclear DNA (the DNA of a chromosome) from mitochondrial DNA (the DNA of energy-producers in a cell), classifications are likely to drastically change again if we can go by what has happened in other groups of animals. Instead of leading to stability (a goal of taxonomy and naming), recent studies have led to total instability. Hobbyists should beware of trying to apply the latest technological studies to their shells or they should be prepared to constantly change labels and not really learn anything in the process.

Fourth, researchers and collectors often forget there is a virtual forest of fossil cones out there as well as the living types. I listed about 1,200 fossil cone species names in *Cone Shells*, and certainly many more have been described since 1977 (when writing basically stopped on the book). Fossil cones can be studied only by morphology, occasionally with some color pattern visible, and thus cannot be integrated into any classification, familial or generic, based on DNA and radular teeth. Quite a bit of recent work shows that fossil cones, as might be imagined, are highly variable in shape and sculpture and also wildly over-named. I've often rather jokingly commented that if all the living cones were painted white, we probably could reduce the number of species to a few dozen, and that is the problem paleontologists face.

Lastly, and most importantly, why is my old book still the only affordable book on the family that a serious collector can buy and use to actually identify cones? You can still get used copies on the Internet for $75 to $100, just a few times the original selling price. Rockel, Korn and Kohn (1995) goes for $500 to $800 if you can find one (I've never been able to afford one); it covers only the Indo-Pacific and now is over 20 years old. The new Tucker and Tenorio (2013) is worldwide in scope, but it retails new for over $180 and doesn't discuss basic identifications; when out of print, it probably will sell for several hundred dollars as well. Of course, both the latter books cover many more "valid" species than mine, but most collectors – even specialists – probably will end up with just a couple of hundred cone species in their collections anyway, and not the super-rare species. Are newer, very expensive books really an aid to retaining collectors of this family? I challenge someone to come out with an affordable, up-to-date cone book that really can be used by general collectors, not just the twelve people with shell budgets in the thousands of dollars a year or the handful interested in the "species" of cones found in every single cove or 100-yard stretch of beach on a tiny island in the Atlantic.

I made some enemies when doing *Cone Shells* (this article may make a few more) and lots of friends as well. It truly amazed me at the time how secretive some workers were and how others simply refused to share information of any type. Today just mentioning certain workers still causes the hair on the back of my neck to bristle. I was never allowed to use any material from the American Museum's huge collection and library, for instance, although it was only a couple of hours away from home. A major researcher on the West Coast refused to even send reprints of his work, let alone answer any questions or make suggestions — but he readily found time to complain about the published book. I remain thankful for the Delaware Museum's cooperation, along with the late Tucker Abbott and Russ Jensen, to this day. After over 36 years, I am still proud of *Cone Shells* and probably would not do it very differently if given a chance today. (If you have a copy around, check the quote from *Gaudy Night* on the publication page.)

Collectors (and scientists) must always remember that the species is not truly a real, natural entity. It is a human construct to satisfy our innate need to pigeon-hole and name everything around us. Also, contrary to what some current workers think, taxonomy and identification are not mechanical operations that can be plugged into a computer – both are a form of scientific art subject to individual effort and interpretation. And I wouldn't have it any other way.

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CRAWFISHES of LOUISIANA
Jewels of the Rainforest - Poison Frogs of the Family Dendrobatidae
Uromastyx
THE LIVING BOAS
A COMPLETE GUIDE TO THE BOAS OF THE WORLD
SHELL COLLECTING

Jerry G. Walls, photo by Maleta Walls.

Jerry Walls has contributed to this magazine before and I was quite pleased when he submitted the article on page 12. Out of curiosity I checked my bookcase for books he had written. There were well over a dozen. Seems I've been a fan for years. **Some** of these books are shown here. All demonstrate his interest in the natural world and desire to share the knowledge he has gained. His present article discusses something all cone collectors have talked about in the last few years.

Jerry is from a small town in central Louisiana, to which he returned in 2001, "...after spending 30 years in New Jersey and hating every winter of it." He obtained his Master's degree in Biology in 1970 and, "... worked for a horrible year as a marine biologist with Louisiana Wildlife & Fisheries, then moved to New Jersey." There he worked as science editor and writer for 30 years at TFH Publications (Tropical Fish Hobbyist), penning over 40 books and 300 articles on a variety of animals, mostly marine invertebrates, reptiles and amphibians, and fishes. In 2001, he packed up his desk at TFH while the Twin Towers in NY were still smoking and returned with his wife, Maleta, to Louisiana. After free-lancing for a few years, in 2006 Jerry started working for Louisiana State University Alexandria teaching biology and anatomy & physiology, a job he still holds. His major taxonomic work (other than mollusks) has been in the crayfishes, where he has described half a dozen new species and authored "Crawfishes of Louisiana" (LSU Press, 2009). Although he still collects shells (mostly cowries at the moment), Jerry's current collecting interests remain mostly with stamps, which he has collected for over 60 years. [editor]

Dream Stream stems teem with stenotremes redux – saturation 3D shelling along the PRR system sets stratospheric standards

by Harry G. Lee and Robert E. Winters

CHAPTER I

It was Labor Day weekend 1996 when Dr. Fred Thompson, Dr. Henry McCullagh, and I (HGL) launched our canoe on the Paint Rock River (PRR) for a six mile reconnaissance from U.S. Route 72 (**Fig. 1**) just south of the town of Paint Rock to the tiny settlement of Butler Mill (twenty miles north of Guntersville, Alabama) on September first. Here the Paint Rock is shielded by a riparian corridor of hardwoods as it meanders through rich farmland. It averages about a hundred feet in breadth and has frequent gravel-bottomed riffles as it drops about twenty feet in altitude on its course to the once-mighty Tennessee River, 21 to 27 miles downstream. Limestone boulders and scarps along the banks and semi-limpid channels serve as a reminder of the calcareous bedrock of the plateau and upland valley it drains. Although the river was at a very favorable (low) stage, the naiads seen were scarce and essentially limited to slim pickings among muskrat-discards at the rodents' habitual feeding stations (middens) along the banks. It was still a productive trip malacologically, however! Fred found colonies of a new aquatic hydrobiid snail (*Marstonia angulobasis* Thompson, 2004), and Henry and I collected, or otherwise accounted for, about twenty naiad species in toto, but there's more to the story.

Somewhat daunted by the slim malacological pickings, I searched about for consolation. I took a few aquatic snails (*Elimia, Pleurocera, Leptoxis, Campeloma*, etc.), but I was soon distracted by the large logjams which festooned the riverbanks at frequent intervals. At closer inspection, these deposits of fluvial wrack at flood peaks up to fifteen feet above the present water level were seen to contain all manner of dismembered upstream flora. To my delight, scattered among the stems and twigs was a smattering of empty, but generally intact, landsnail shells. After sampling about a dozen and a half of the larger drift banks, I realized I had almost two hundred specimens of perhaps twenty species. Recalling my own advice to landsnailers (Lee, 1993), I grabbed several handfuls of stems, etc. from the last few strands and stuffed them into a one gallon Ziploc® plastic bag.

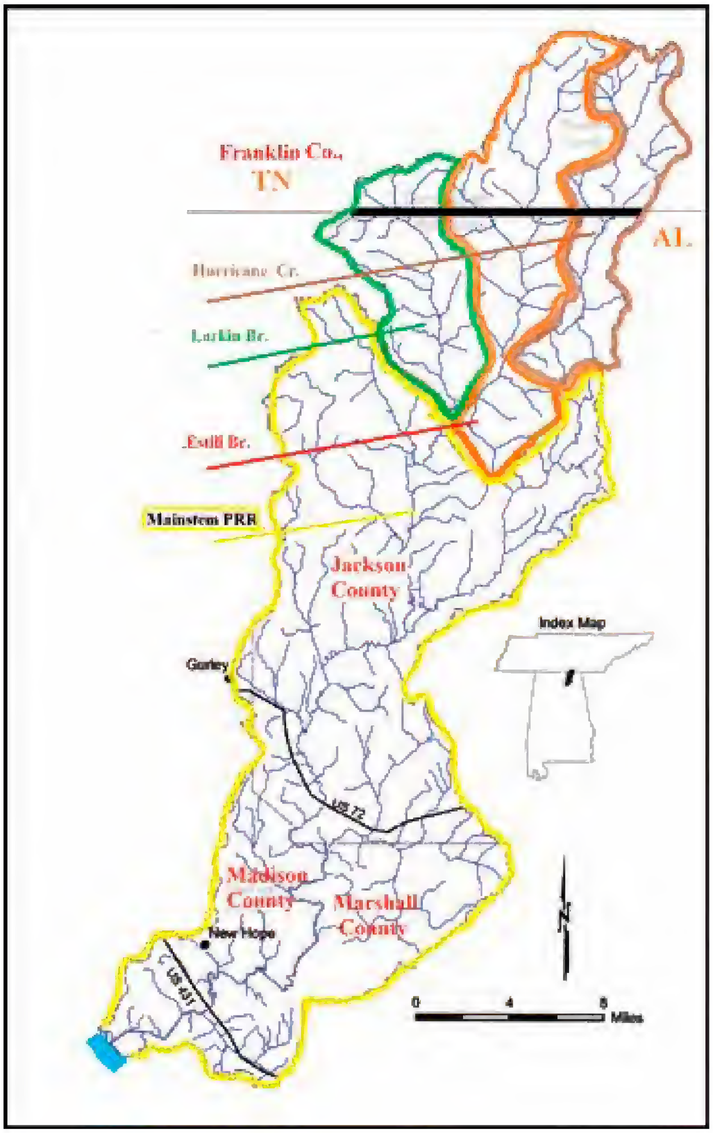

Fig. 1. The drainage area feeding into the Paint Rock River.

It took a week to dry (180 degrees for 6 hours), sieve, and finally microscopically examine the stems (etc.) the Ziploc® disgorged, but there was, as predicted, ample reward. A number of snail specimens, far too minute to be plucked in the field by visual reconnaissance, were added to the day's field cullings. The total count, 32 species, was considered a good snail catch for a single station in this part of the world. Of the total, the "stenotremes" (*Stenotrema* and *Euchemotrema*; treated as the former genus at the time), all shells of which were visually-plucked in the field, were dominant both in total numbers and a formidable seven species

(Lee, 1996). Admittedly a little overwhelmed by this diversity and novelty, I put in a few hours sorting and resorting these 120 or so stenotremes and came up with a conchological key for this group (Lee, loc. cit.). Unfortunately, no one can actually know where these 32 species lived in the 500 or so square miles (**Fig. 1**) that shed the waters which rafted and stranded their shells along our day's itinerary.

The experience impelled me to commemorate the expedition with the title of which is repeated in the first half of the one heading this essay. I have never been back to the PRR, but a kindred spirit (with his newly adopted patron saint) has.

CHAPTER II

About six years ago I (REW) "took a page" from HGL's book (Lee, 1996) and began retrieving mollusk specimens from flood drift, detritus, and debris (**3D**) along the PRR (**Figs. 2, 3, 4**). This is a great way to collect as it yields almost fresh specimens without killing the animals. Principally, I look for land shell specimens in the 3D, but occasionally a good specimen of a fresh water snail or bivalve is found. Monitoring river levels is the best way to determine if a flood has piled up the 3 D's. To date, about 30 3D samples have been taken from 16 stations along the PRR system (**Table 1**).

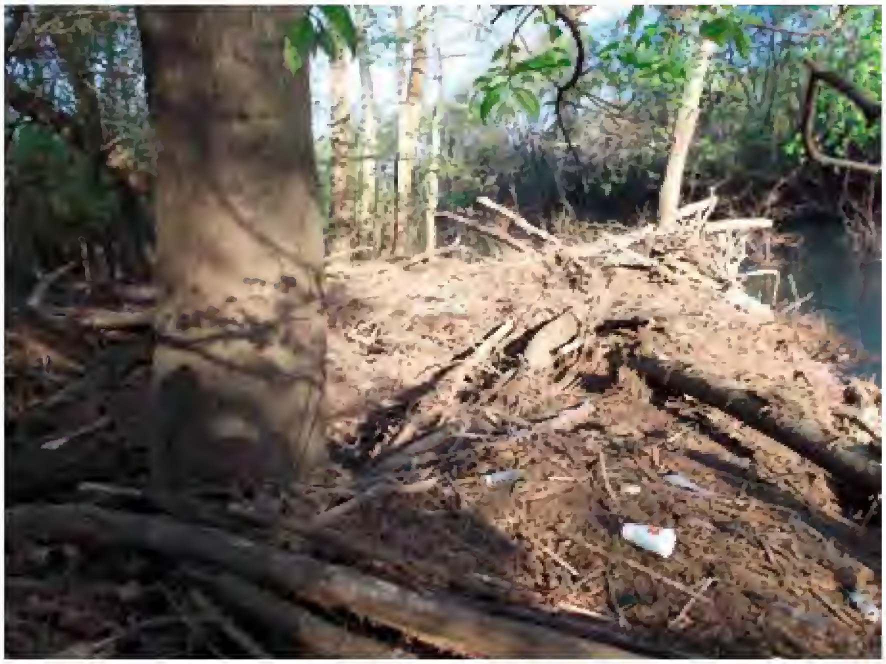

Fig. 2. The last pile of debris where the sinistral specimen of *Xolotrema obstrictum* was found.

On St. Patrick's Day 2015, I was collecting in one of my favorite places, the flood debris piles of the Estill Fork in Jackson Co., Alabama (**Station 9**; **Table 1**.). The rains and melting snow had pushed the water level of the normal 1.2 ft. Estill Fork to over nine feet. The Estill Fork and the Larkin Fork combine just above Princeton, Alabama, to form the PRR. Both Forks fall off the southeastern face of

Table 1. PRR system 3D stations collected by Robert E. Winters. Many visited more than once; average ~ twice, from 2009-2015 (see Fig. 1).

1. AL: Jackson Co: Larkin Fork of the Paint Rock River at Francisco, dry stream flood channel.
2. AL: Jackson Co: Larkin Fork, 3 miles SE of Francisco, east stream bank and low fields.
3. AL: Jackson Co: Larkin Fork, un-named hollow 4 miles SE of Francisco, mouth of freshet run and east bank.
4. AL: Jackson Co: Larkin Fork, Simpson Hollow, 1 mile N of Larkin, 2 miles of freshet run and east bank of Larkin Fork.
5. AL: Jackson Co: Estill Fork of the Paint Rock River, Burks Creek at CR175 bridge, both banks.
6. AL: Jackson Co: Estill Fork, Hurricane Creek at last private bridge S of CR9, steep north bank: limestone bluff with rubble, south bank high and muddy.
7. AL: Jackson Co: Estill Fork where CR175 runs into the water just S of the AL/TN border, low east bank adjacent to large weed-choked agricultural field.
8. AL: Jackson Co: Estill Fork at CR146 bridge, both banks.
9. AL: Jackson Co: Estill Fork 1 mile N of Estillfork, both banks.
10. AL: Jackson Co: Paint Rock River across from Horseshoe Cove, both banks and low field at the ford.
11. AL: Jackson Co: Paint Rock River, Swaim at jct. SR65 and CR27, both banks.
12. AL: Jackson Co: Paint Rock River 1 mile below Princeton, both banks.
13. AL: Jackson Co: Paint Rock River 2 miles below Hollytree, high limestone bluff and rubble on west bank and low field at the east bank ford.
14. AL: Madison Co: Paint Rock River at Butler Mill, high west bank.
15. AL: Marshall Co: Paint Rock River at Butler Mill, low east bank.
16. AL: Marshall Co: Paint Rock River 1 mile W of Humpton, high limestone bluff east bank.

the Cumberland Plateau and have high stream gradients. This means that they flood quickly but also drop back to normal quickly. Such was the case when I arrived, a scant three days after high water.

The pickings were amazing. The numerous small tributaries and intermittent freshets of the upper Estill Fork had washed thousands of land snails downstream to this choke point. I handpicked over 1,000 freshly dead snails >4mm. I also filled four 5 gallon buckets with fine detritus, e.g., **Fig. 4**, for further sifting and specimen extraction. At the end of four hours, my 68 year old back was telling me to call it a day; however a leprechaun or perhaps the great Saint himself whispered to me, "Cover the whole choke point completely." Literally there on the last small pile of debris, e.g., **Fig. 2**, I found a sinistral specimen of *Xolotrema obstrictum* (Say, 1821). Anyone standing on the stream bank would have thought that I had a bit too much whiskey in celebration of the Saint's Day. This was the first sinistral polygyrid that I have ever encountered. A fine bit of "left-handed luck" for a half Irishman.

CHAPTER III

After I (HGL) read REW's accounts on-line (Winters, 2014, 2015a, 2015b) this spring, we engaged in correspondence, and by mid-summer I'd received about five gallons of sieve-selected fines winnowed from the likes of the stuff in **Fig. 4** that Bob had set aside from the St. Patrick's Day harvest at Station 9. It took a couple of weeks to cull and identify the microsnails, but the results were close to stupendous. Combining these microspecies from the St. Patrick's Day take with the macrosnails identified by REW and/or Dr. Tim Pearce from it and the other PRR 3D collections, an astounding 102 landsnail species can be accounted for. An analysis, in phylo-alphabetical order is presented in **Table 2**.

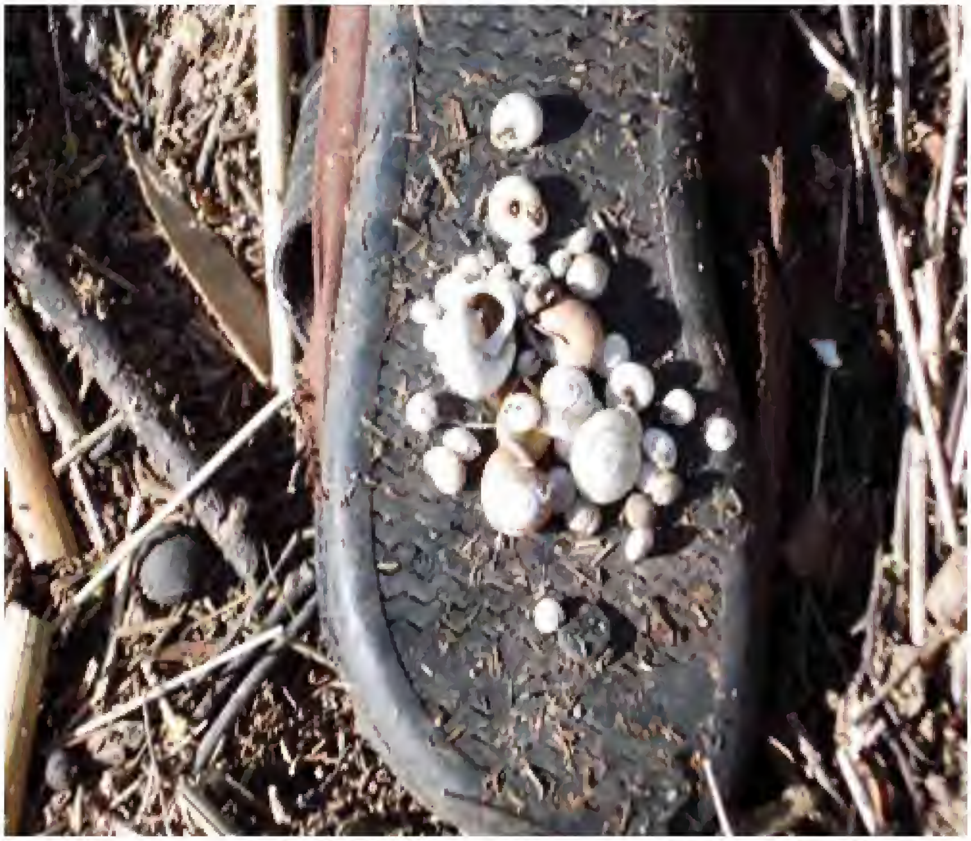

Fig. 3. The old shoe might have a history, but our interest was in the snail shells found along with the shoe.

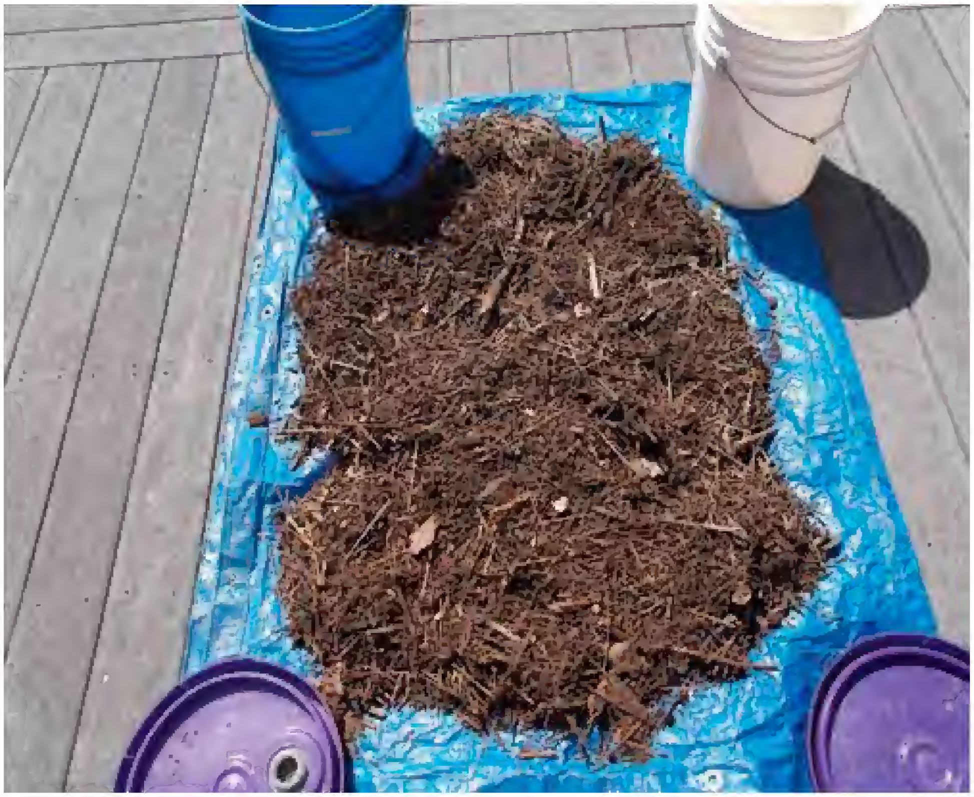

Fig. 4. Four 5 gallon buckets of snail-rich debris.

Table 2. Annotated inventory of the 102 landsnail taxa identified in the PRR 3D samples (2009-2015).

Helicina orbiculata (Say, 1818) Globular Drop NUC
Pomatiopsis lapidaria (Say, 1817) Slender Walker NUC
***_Carychium arboreum_ Dourson, 2012 Tree Thorn** NUC
Carychium clappi Hubricht, 1959 Appalachian Thorn UC
***_Carychium exiguum_ (Say, 1822) Obese Thorn** UC
Carychium exile I. Lea, 1842 Ice Thorn NUC
Carychium nannodes G. Clapp, 1905 R
Cochlicopa lubrica (Müller, 1774) Glossy Pillar UC
Cochlicopa morseana (Doherty, 1878) Appalachian Pillar UC
Columella simplex (Gould, 1841) Toothless Column R
***_Gastrocopta armifera_ (Say, 1821) Armed Snaggletooth** A
***_Gastrocopta contracta_ (Say, 1822) Bottleneck Snaggletooth** A
***_Gastrocopta corticaria_ (Say, 1817) Bark Snaggletooth** A
***_Gastrocopta pentodon_ (Say, 1822) Comb Snaggletooth** A
***_Gastrocopta procera_ (Gould, 1840) Wing Snaggletooth** A
***_Gastrocopta tappaniana_ (C.B. Adams, 1841) White Snaggletooth** A
Pupoides albilabris (C.B. Adams, 1841) White-lip Dagger A
***_Vertigo gouldii_ (A. Binney, 1843) Variable Vertigo** C
***_Vertigo milium_ (Gould, 1840) Blade Vertigo** A
***_Vertigo oralis_ Sterki, 1898 Palmetto Vertigo** UC
***_Vertigo oscariana_ Sterki, 1890 Capital Vertigo** UC
***_Vertigo ovata_ Say, 1822 Ovate Vertigo** UC
***_Vertigo pygmaea_ (Draparnaud, 1801) Crested Vertigo** R
***_Vertigo rugosula_ Sterki, 1890, Striate Vertigo** R
***_Vertigo tridentata_ Wolf, 1870 Honey Vertigo** A
***_Strobilops aeneus_ Pilsbry, 1926 Bronze Pinecone** C
***_Strobilops labyrinthicus_ (Say, 1817) Maze Pinecone** UC
***_Strobilops texasianus_ Pilsbry & Ferriss, 1906 Southern Pinecone** R
Punctum blandianum Pilsbry, 1900 Brown Spot R
***_Punctum minutissimum_ (I. Lea, 1841) Small Spot** A
Haplotrema concavum (Say, 1821) Gray Lancetooth A
Novisuccinea ovalis (Say, 1817) Oval Ambersnail R
Anguispira columba (G. Clapp, 1920) Dove Tigersnail NUC
Anguispira cumberlandiana (I. Lea, 1840) Cumberland Tigersnail R
Anguispira jessica Kutchka, 1938 Mountain Disc C
Discus clappi (Pilsbry, 1924) Channeled Disc R
Discus nigrimontanus (Pilsbry, 1924) Black Mountain Disc d. Pearce UC
Discus patulus (Deshayes, 1830) Domed Disc C
***_Helicodiscus aldrichianus_ (G. Clapp, 1907) Burrowing Disc** UC
***_Helicodiscus_ sp. cf. _H. notius notius_ Hubricht, 1962 Tight Coil** A
Lucilla sp. cf. _L. barri_ (Hubricht, 1962) Raccoon Coil d. Pearce R
Lucilla sp. cf. _L. hadenoecus_ (Hubricht, 1962) Cricket Coil d. Pearce R
***_Lucilla punctatella_ (Morrison, 1942) Punctuate Coil** R
***_Lucilla sp._ cf. _L. scintilla_ (Lowe, 1852) Oldfield Coil** C
***_Lucilla singleyana_ (Pilsbry, 1890) Smooth Coil UC**
***_Euconulus chersinus_ (Say, 1821) Wild Hive** A
***_Euconulus dentatus_ (Sterki, 1893) Toothed Hive** C
***_Gastrodonta interna_ (Say, 1822) Brown Bellytooth** A
***_Guppya sterkii_ (Dall, 1888) Sterki's Granule** C
Glyphyalinia cryptomphala (G. Clapp, 1915) Thin Glyph NUC
Glyphyalinia lewisiana (G. Clapp, 1908) Pale Glyph NUC
Glyphyalinia praecox (H.B. Baker, 1930) Brilliant Glyph C
Glyphyalinia wheatleyi (Bland, 1883) Bright Glyph NUC
***_Hawaiia alachuana_ (Dall, 1885) Southeast Gem** C
***_Hawaiia minuscula_ (A. Binney, 1841) Minute Gem** A
Mesomphix anurus Hubricht, 1962 Frog Button R
Mesomphix capnodes (W.G. Binney, 1857) Dusky Button NUC
Mesomphix globosus (MacMillan, 1940) Globose Button R
***_Paravitrea_ sp. cf. _P. capsella_ (Gould, 1851) Dimple Supercoil** NUC
***_Paravitrea multidentata_ (A. Binney, 1841) Dentate Supercoil** UC
Paravitrea petrophila (Bland, 1883) Cherokee Supercoil d. Pearce UC
***_Paravitrea_ sp. cf. _P. pilsbryana_ (G. Clapp, 1919) Translucent Supercoil** R
***_Striatura meridionalis_ (Pilsbry & Ferriss, 1906) Southern Striate** A
Striatura milium (Morse, 1859) Fine-ribbed Striate d. Pearce UC
Ventridens acerra (J. Lewis, 1870) Glossy Dome A
Ventridens sp. cf. _V. coelaxis_ (Pilsbry, 1899) Bidentate Dome R
Ventridens collisella (Pilsbry, 1896) Sculptured Dome C
Ventridens demissus (A. Binney, 1843) Perforate Dome C
Ventridens gularis (Say, 1821) Throaty Dome C
Ventridens ligera (Say, 1821) Globose Dome UC
Zonitoides arboreus (Say, 1817) Quick Gloss C
Zonitoides lateumbilicatus (Pilsbry, 1895) Striate Gloss d. Pearce NUC
Euchemotrema leai aliciae (Pilsbry, 1893) Alicia's Pillsnail UC
Inflectarius inflectus (Say, 1821) Shagreen A
Inflectarius rugeli (Shuttleworth, 1852) Deep-tooth Shagreen NUC
Inflectarius smithi (G. Clapp, 1905) Alabama Shagreen A
Lobosculum pustuloides (Bland, 1858) Tiny Liptooth A
Mesodon clausus (Say, 1821) Yellow Globelet C
Mesodon elevatus (Say, 1821) Proud Globe R
Mesodon sanus (Clench & Archer, 1933) Squat Globe A
Mesodon thyroidus (Say, 1817) White-lip Globe A
Mesodon zaletus (A. Binney, 1837) Toothed Globe A
Millerelix plicata (Say, 1821) Cumberland Liptooth C
Neohelix albolabris (Say, 1817) Whitelip C
Neohelix fuscolabris (Pilsbry, 1903) Brownlip UC
Patera appressa (Say, 1821) Flat Bladetooth UC
Patera perigrapta (Pilsbry, 1894) Engraved Bladetooth NUC
Patera sargentiana (C.W. Johnson, 1821) Grand Bladetooth NUC
Stenotrema calvescens Hubricht 1961 Chattanooga Slitmouth R
Stenotrema deceptum (G. Clapp, 1905) Monte Sano Slitmouth A
Stenotrema exodon (Pilsbry, 1900) Alabama Slitmouth C
Stenotrema hirsutum (Say, 1817) Hairy Slitmouth NUC
Stenotrema macgregori Dourson, 2011 MacGregor's Slitmouth R
Stenotrema spinosum (I. Lea, 1830) Carinate Slitmouth NUC
Stenotrema stenotrema (L. Pfeiffer, 1842) Inland Slitmouth A
Stenotrema turbinella (Clench & Archer, 1933) Little Turban Slitmouth UC
Triodopsis hopetonensis (Shuttleworth, 1852) Magnolia Threetooth A
Triodopsis tennesseensis (Walker & Pilsbry, 1902) Budded Threetooth NUC
Triodopsis tridentata (Say, 1817) Northern Threetooth C
Triodopsis vulgata Pilsbry, 1940 Dished Threetooth C
Xolotrema carolinense (I. Lea, 1834) Blunt Wedge NUC
Xolotrema obstrictum (Say, 1821) Sharp Wedge C

- 5 specimens = Rare (R)
- 6-20 specimens = Uncommon (UC)
- 21-50 specimens = Not uncommon (NUC)
- 51-100 specimens = Common (C)
- >100 specimens = Abundant (A)

Boldface connotes taken in the most provident sample: Station 9: Bob Winters! 17 March, 2015. These **84 taxa** (_Mesomphix_ ID'ed only to genus) comprise 41 microspecies (< 5.50 mm when adult) plus 7 more species identified from juvenile specimens of non-microspecies culled from fine particle sievings (HGL) and 36 non-microspecies (REW); included in the latter moiety was the sinistral specimen of _Xolotrema obstrictum_ mentioned above. As noted in the table, some of the 17 remaining species were identified by Dr. Tim Pearce. These specimens are vouchered at the Carnegie Museum, Pittsburgh in his care.

*Indicates represented by a scanning electron micrograph (SEM) image in **Plate 1**. These hypotypes are vouchered at the Florida Museum of Natural History, Gainesville.

This is certainly a prodigious list, both in numbers of specimens and in species richness. Furthermore, there are some rare, one possibly unnamed, and some significant range extensions as indicated by the comments in the explanation under **Plate 1**). On the order of 20% of the known shelled landsnail species in the USA, east of the Rockies, are included. Since the PRR drains an area known to be landsnail friendly by geography (Hubricht, 1985) and habitat: the limestone-rich steep (in its tributaries) landscape through which it runs allows snails to prosper (and their shell remains to persist longer than in other terrains), the authors expected a rich harvest. A hundred-odd species was quite an optimistic target, but 84 from a single collecting event was hyperbolic. Provident collections such as these, especially a focused one such as the St. Patrick's Day 2015 exercise, yield a generous representation of a regional fauna without the destruction of living specimens and critical habitat, extensive deployment of resources (e.g., time, manpower and transportation), and with greater return of specimens and diversity compared to conventional methodologies. Ecologists and zoogeographers may lament the lack of precision inherent in our protocols; nonetheless we believe we've demonstrated the value of 3D collecting in an integrated approach to the understanding of landsnail communities, species diversity, and, in the future, their population trends.

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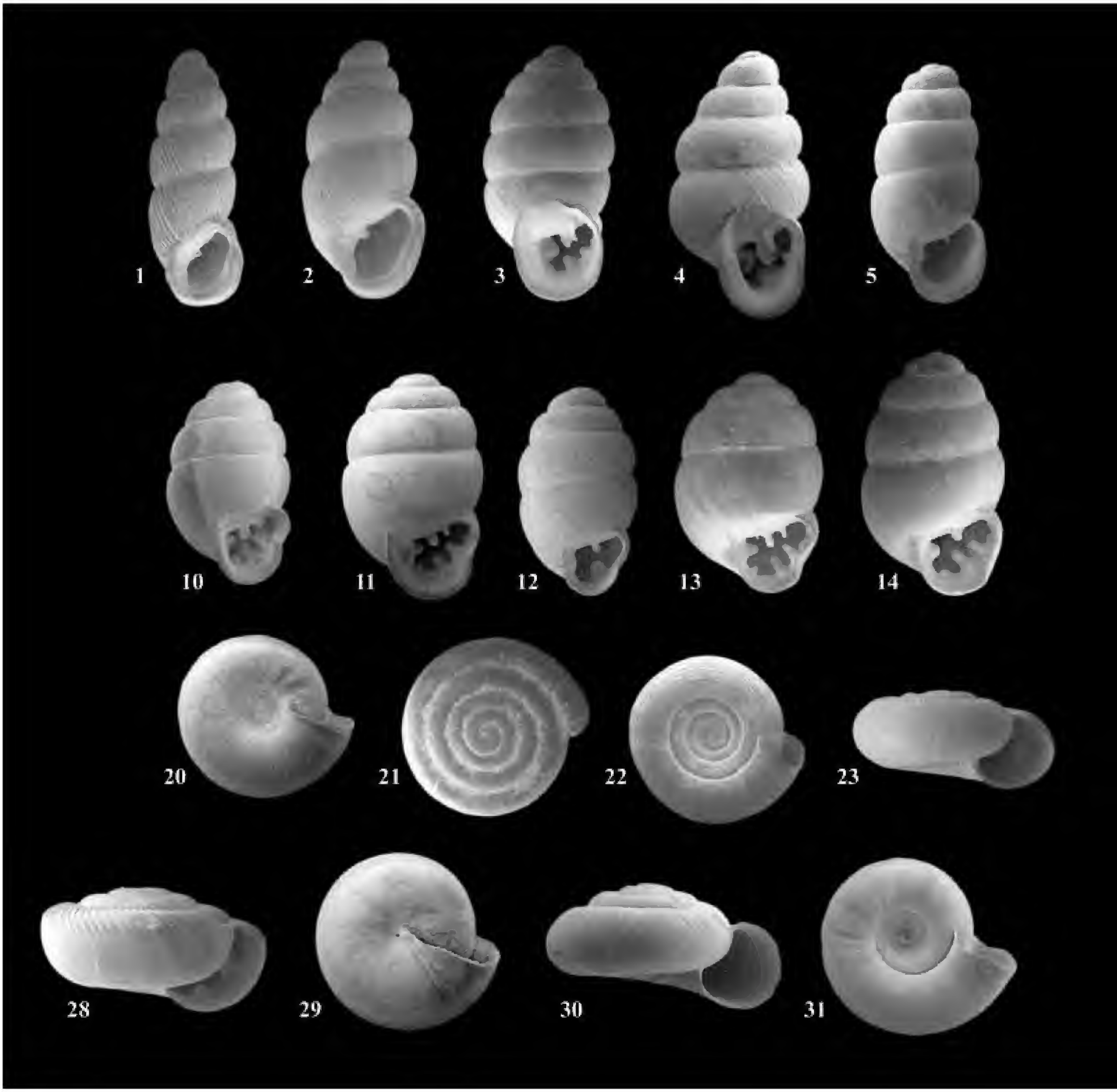
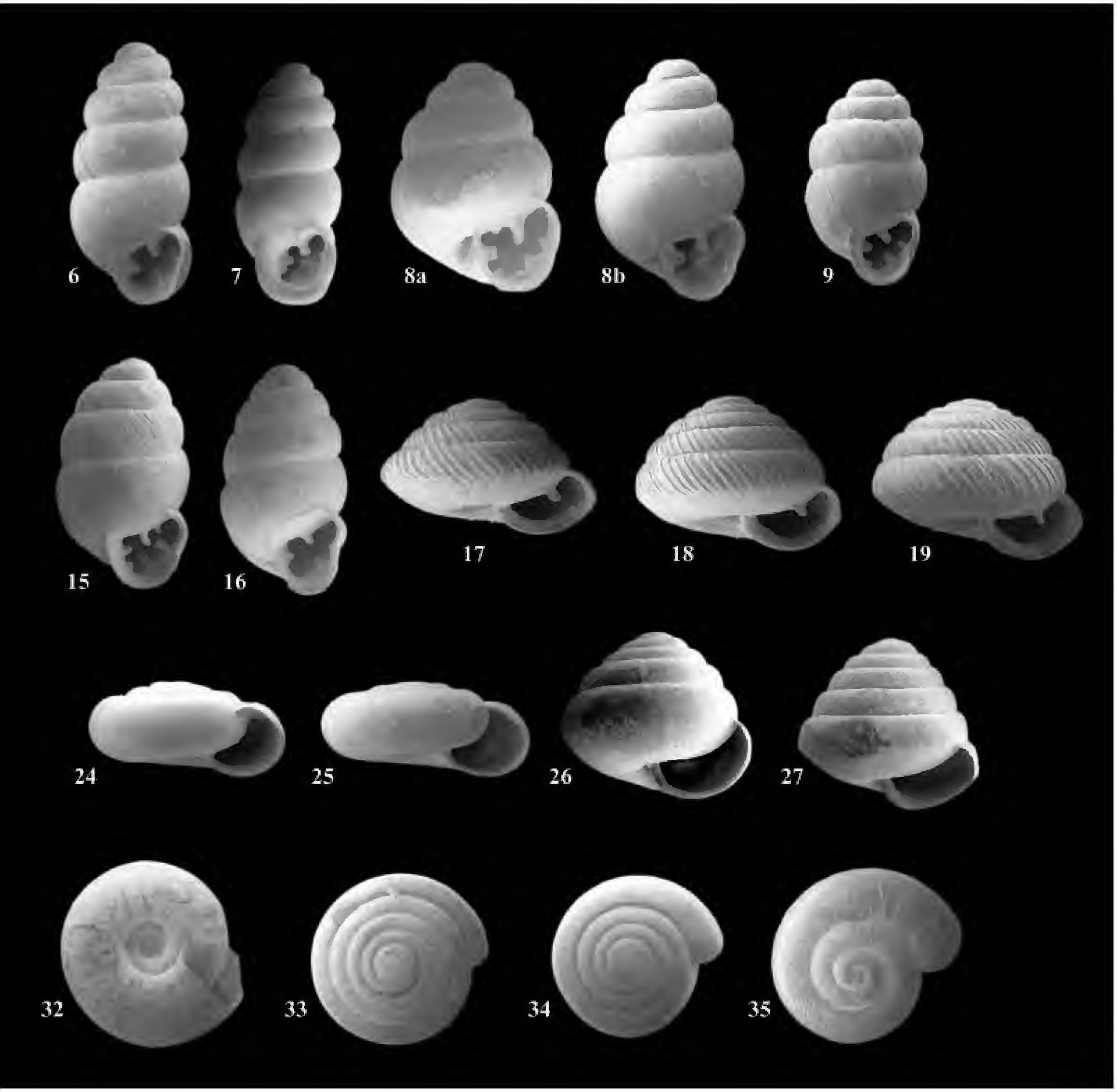


Plate 1. Selected shells from the March 17, 2015, Station 9 PRR 3D sample: 34 microspecies (plus one atypical spe

Row 1: 1. *Carychium arboreum* 1.77mm [range extension from Smoky Mts.], 2. *C. exiguum* 1.45mm, 3. *Gastrocopta*
8a&b. *G. tappaniana* [two shells; L, 1.41mm, has umbilicus and infraparietal denticle; unique; R, 1.58mm], 9. *Ver*
Row 2: 10. *Vertigo milium* 1.39mm, 11. *V. oralis* 1.68mm, 12. *V. oscariana* 1.27mm. 13. *Vertigo ovata* 1.57mm, 14. *V.*
***lops aeneus* 2.15mm, 18. *S. labyrinthicus* 1.97mm, 19. *S. texasianus* 2.11mm.**
Row 3: 20. *Punctum minutissimum* 1.14mm, 21. *Helicodiscus aldrichianus* 1.76mm [very rare; TN specimen], 22. *H*
range extension], 24. *L. scintilla* 1.87mm, 25. *L. singleyana* 1.71mm, 26. *Euconulus chersinus* 1.91mm, 27. *E. denta*
Row 4: 28. *Gastrodonta interna* 1.85mm [juvenile; reaches ~ 9mm], 29. *Guppya sterkii* 1.01mm, 30. *Hawaiia minu*
need of taxonomic revision], 33. *P. multidentata* 2.22mm, 34. *Paravitrea* sp. cf. *P. pilsbryana* 2.45mm [another speci



ecimen) and one juvenile of a larger species. Not to scale; for details see plate explanation below.

a armifera 3.63mm, 4. _G. contracta_ 2.04mm, 5. _G. corticaria_ 1.97mm, 6. _G. pentodon_ 1.87mm, 7. _G. procera_ 2.05mm,
rtigo gouldii 1.47mm.

pygmaea 1.76mm [major southward range extension], 15. _V. rugosula_ 1.80mm, 16. _V. tridentata_ 1.77mm, 17. _Strobi-_

_I._ sp. cf. _H. notius_ 3.11mm [umbilicus consistently wider; n. sp?], 23. _Lucilla punctatella_ 1.41mm [very rare species;
tus 1.88mm.

scula 2.14mm, 31. _H. alachuana_ 2.08mm, 32. _Paravitrea_ sp. cf. _P. capsella_ 2.03mm [n. sp ? – a species complex in
ies complex?], 35. _Striatura meridionalis_ 1.39mm.

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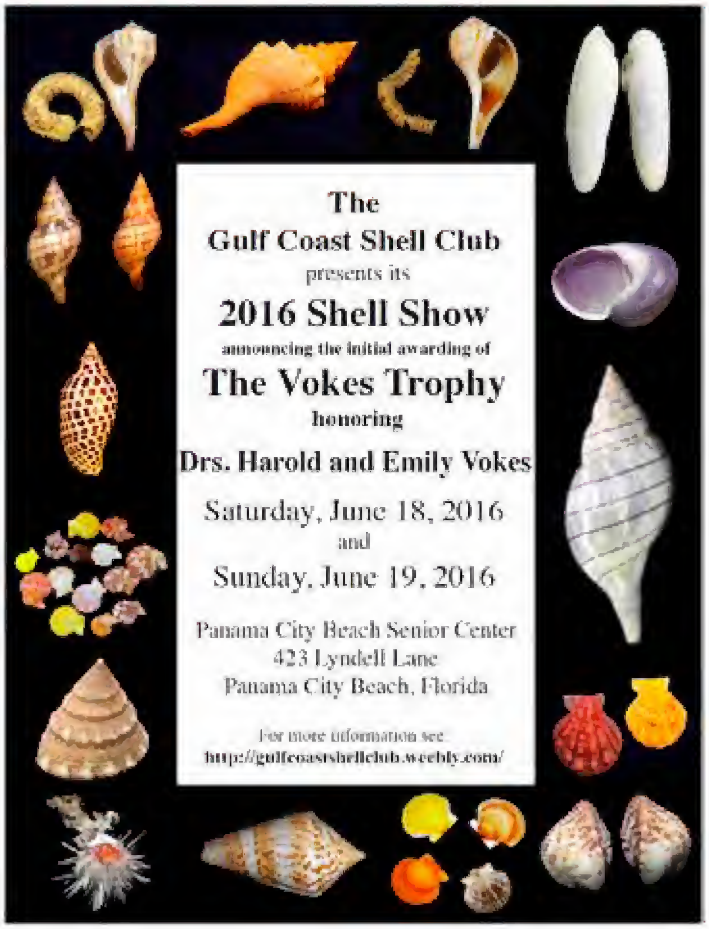
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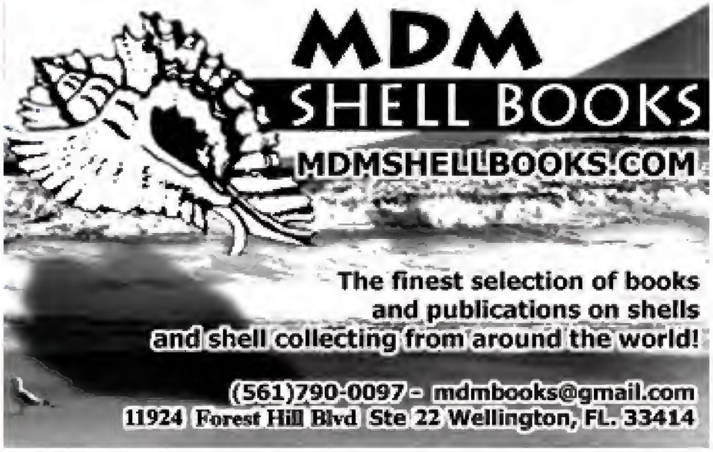
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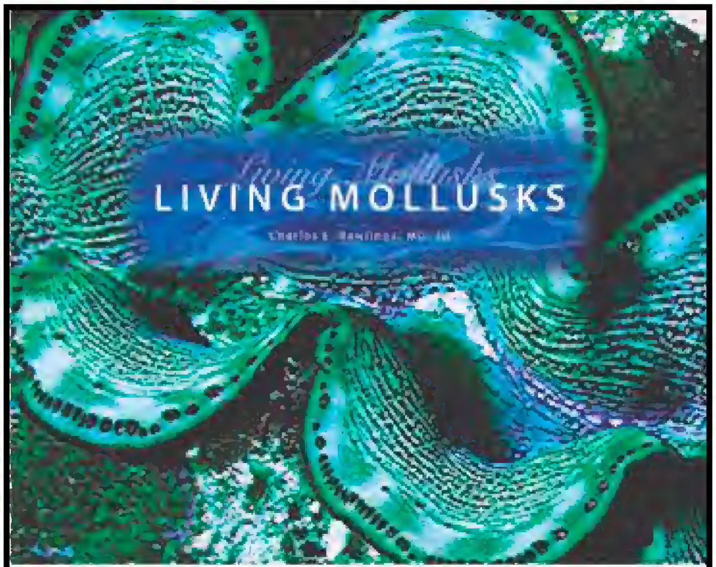

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The Ohio State University freshwater mussel collection

F. Matthew Blaine

Curatorial Associate
Delaware Museum of Natural History

Research Associate
The Florida State Collection of Arthropods

Research Associate
The McGuire Center for Lepidoptera and
Biodiversity at the Florida Museum of
Natural History, University of Florida

Fig. 1. Our host, Tom Watters amidst the Ohio State University mollusk collection.

Back in October 2013 my wife and I decided to drive to Ohio State University to attend OVUM 7. In case you were wondering, OVUM stands for Ohio Valley Unified Malacologists, which is one of the regional group meetings devoted to malacology. In these meetings scientists, citizen scientists, students, and interested parties present papers and PowerPoint presentations to attentive audiences. Other regional groups include SCUM (Southern California United Malacologists), MAM (Mid Atlantic Malacologists), and FUM (Florida Unified Malacologists).

I was going to present a PowerPoint presentation on my research titled, "The freshwater mussels of Sussex County, Delaware". I was very excited about the trip because in addition to giving my presentation I was going to get to see the vast collection overseen by my friend G. Thomas Watters, who in addition to hosting OVUM 7 is Curator of Mollusks, Department of Evolution Ecology and Organismal

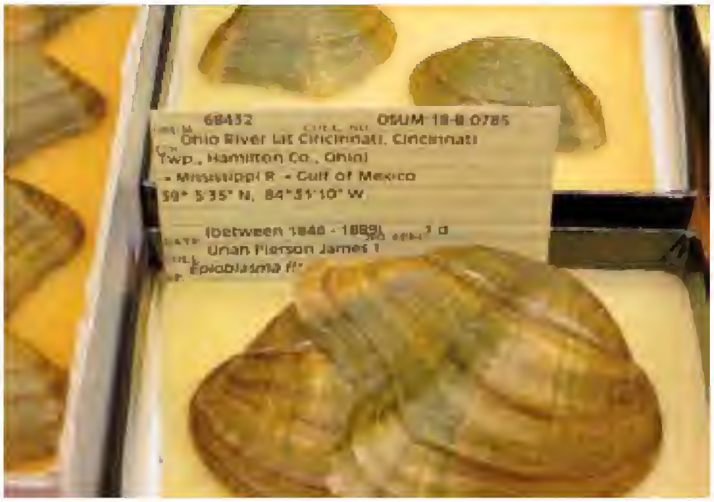

Fig. 2. ***Epioblasma flexuosa*** **Rafinesque, 1831, collected in the mid-to-late 1800s and now with GPS coordinates on the label. This species (like too many US freshwater mussels) is extinct.**

Fig. 3. A look at the extensive molluscan collection at the Ohio State University.

Biology. We were going to get a guided tour of Ohio State University's extensive collection!

Tom was a gracious host and after providing us with a parking pass that would prevent our car from being ticketed or towed, he explained to us a little bit about the collection as an introduction (Fig. 1). The collection is a research collection and there are offices with people working on their respective projects around the building. In addition there was an ongoing project to add GPS locations to labels that were written before the invention of GPS and had accurate collection locations on their labels. They used the machine that projected detailed maps of collection areas and when the cursor is placed at the appropriate spot the GPS coordinates appeared. These coordinates were then added to the appropriate labels (Fig. 2). Notice that the specimens were collected between 1846 and 1889, way before GPS and yet GPS coordinates are provided. Brilliant!

The collection inhabits a vast space much like a huge warehouse and is made up of cabinets in addition to rows and rows of shelving, all filled with mollusks, bivalves and gastropods (Fig. 3). A major focus of the collection is fresh water mussels (Figs. 4-7). There are many exceedingly rare specimens (Figs. 6-7).

If you are a marine bivalve collector you will immediately notice that all of the fresh water mussels are disarticulated. Tom once told me that the first thing that he does when new material comes into the museum is to break the valves of each shell apart. "This drives marine bivalve people crazy" he explained. One very important thing about identifying fresh water mussels is the complex structure of the teeth and other features inside of the shell around the hinge area. Thus having the shells separated is important. In addition it makes storing them much easier.

The collection also has many land snails. Here is a drawer full of Achatinellidae (Fig. 8). I was particularly interested in how they are housed and displayed. As you can see, each glass vial has one or more specimens with the appropriate data displayed so it can be read while the vials are in cabinet drawers. To my delight, there were also vials of pea or fingernail clams (Sphaeriidae). I have been searching many years for them and have never found them in the wild. The illusive, for me, *Sphaerium* (Fig. 9) is finally within my view.

Tom gave us time to wander through the collection. There are shelves full of boxes of fresh water mussels (Figs. 10-11). Finally we did a tour of the wet collection where specimens are preserved in ethyl alcohol (Figs. 12) and then it was time to attend OVUM.

Visiting The Ohio State University Mollusks Department of Evolution Ecology and Organismal Biology was a memorable experience for us. I thank Dr. Watters for providing us with this remarkable experience.

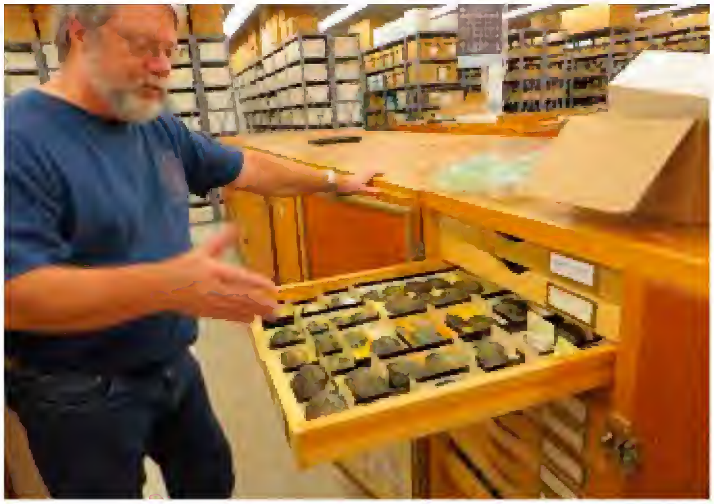

Fig. 4. Tom explains the collection storage and display system.

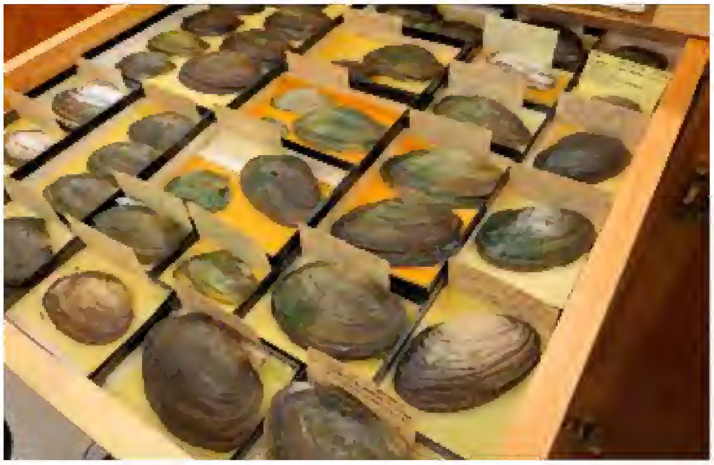

Fig. 5. *Lasmigona compressa* (Lea, 1829). Listed as a "species of concern" by the Ohio Division of Wildlife.

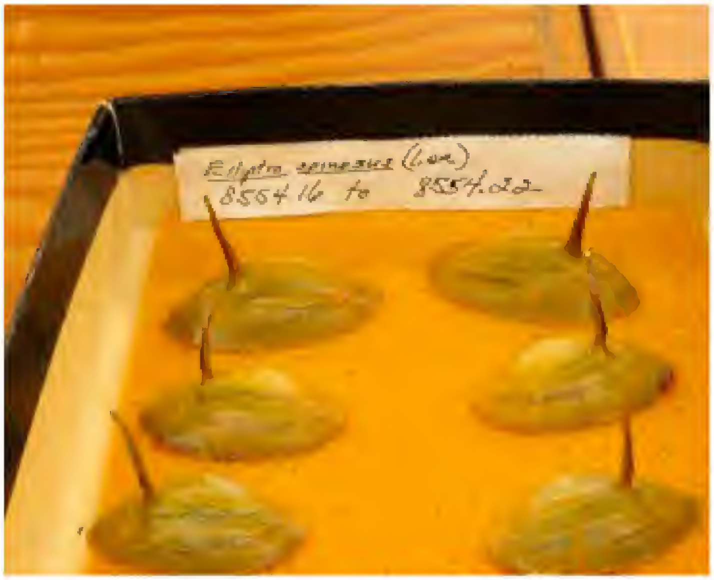

Fig. 6. *Elliptio spinosa* (Lea, 1836), an Alabama endemic, is listed as endangered by the International Union for Conservation of Nature.

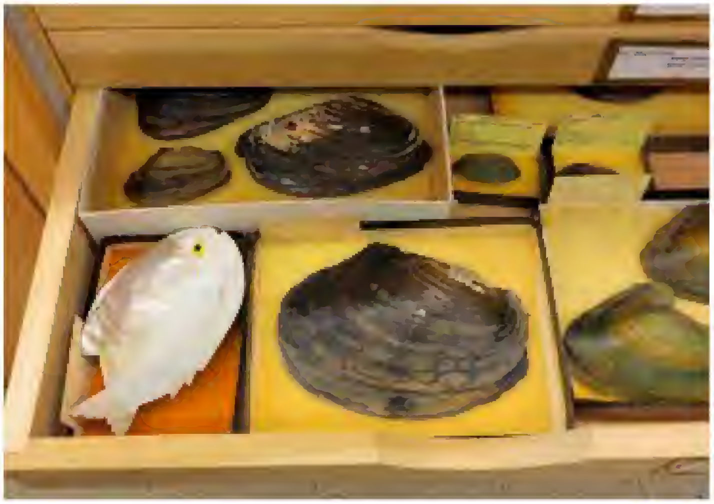

Fig. 7. *Cristaria spatioca* (Clessin, 1875) from Japan and also a species of concern. Note the rare freshwater mussel that imitates a fish.

Fig. 8. Vials of Achatinellidae, small colorful tree snails found throughout the Pacific islands. The greatest variety occured in Hawaii (called the Oahu tree snail), but habitat destruction and introduced species left maybe 10 extant *Achatinella* species out of the original 265+.

Fig. 9. A drawer of the small brown *Sphaerium* (fingernail clams) I have yet to collect in the wild.

Fig. 10. I investigate some of the countless boxes of freshwater mussels. Photo by Dona Blaine.

Fig. 11. Even more boxes of freshwater mussels.

Fig. 11. A small portion of the wet collection - mollusks in alcohol.

2016 SHELL SHOWS & RELATED EVENTS (January – July 2016)

Information is subject to change. Please verify with the individual organization.

Jan. 9-10, 2016
SPACE COAST SEASHELL FESTIVAL, Melbourne, FL
The Melbourne Auditorium, 625 E. Hibiscus Blvd.
Alan Gettleman, 2225 Tanglewood Lane, Merritt Is., FL 32953-4287
E-mail: lychee@cfl.rr.com Tel. (321) 536-2896

Jan. 16-17, 2016
51st BROWARD SHELL SHOW, Pompano Beach, FL
Emma Lou Olson Civic Center, 1801 Northeast 6th Street
Alice Pace, 7405 SW 128 Ct., Miami, FL 33183
E-mail: alicepace90@att.net Tel. (305) 301-1296 (Cell)

Feb. 11-13, 2016 ***(New: Thursday – Saturday)***
52nd ANNUAL SARASOTA SHELL SHOW, Palmetto, FL
Bradenton Area Convention Center, 1 Haben Blvd.
Donna Cassin, 3432 Highlands Bridge Rd., Sarasota, FL 34235
E-mail: dcassin941@gmail.com Tel. (941) 362-3302

Feb. 20 , 2016
FUM (FLORIDA UNITED MALACOLOGISTS), Sanibel, FL
Bailey-Matthews National Shell Museum, Sanibel, FL
José Leal, Bailey-Matthews National shell Museum
3075 Sanibel Captiva Road, Sanibel, FL 33957
E-mail: jleal@shellmuseum.org Tel. (239) 395-2233

Feb. 27-28, 2016
ST. PETERSBURG SHELL SHOW, Seminole, FL
Seminole Recreation Center, 9100 113th St. N., Seminole, FL
John Jacobs, 202 Soldier Court , Seffner , FL 33584
E-mail: johncheryl@earthlink.net Tel. (813) 309-2608 (Evening)
Exhibit form available at web site: http://www.stpeteshellclub.org

Mar. 3 - 5, 2016
79th SANIBEL SHELL SHOW, Sanibel, FL
Sanibel Community Center, 2173 Periwinkle Way
Mary Burton, 558 Foxcreek Drive, Lehigh Acres, FL 33974
E-mail: marybsanibel@hotmail.com Tel. (239) 395-3626
Website: www.thesanibelcaptivashellclub.com

Mar. 10-12, 2016
MARCO ISLAND SHELL CLUB SHOW XXXV, Marco Is., FL
United Church of Marco Island, 320 North Barfield
Jae Kellogg, 1402 N. Collier Blvd., Slip D-6, Marco Island, FL 34145
E-mail: pjsailkw@gmail.com Tel. (239) 253-8483

Mar. 12-13, 2016
XXVII PARIS INTERNATIONAL SHELL SHOW, Paris, France
Espace Charenton, 327 rue de Charenton, 75012 Paris
Perrine Dardart, 8, Rue des Tilleuls, 02190 Pignicourt, France
E-mail: perrine.dardart@gmail.com Tel. 33 (3) 23-22-46-41

Apr. 15-17, 2016
AUSTRALIAN NATIONAL SHELL SHOW, Brisbane
Gaythorne Bowls Club, 18 Prospect Road, Gaythorne 4051
Brisbane Shell Club, P.O. Box 78, Arana Hills, Qld 4054
Email: brisbaneshellclub@powerup.com.au
https://www.facebook.com/groups/1434389403526873/

Apr. 23, 2016
BRITISH SHELL COLLECTOR'S CLUB CONVENTION, Essex, England
Theydon Bois Community Centre, Essex
Deborah Rolfe, 15 Dene Holm Road, Northfleet, Kent DA11 8LF, UK
Email: deborah@deborahrolfe.orangehome.co.uk, Tel. 44 1474 567 827

May 21-22, 2016
XXVI BELGIUM INTERNATIONAL SHELL SHOW, Antwerp, Belgium
"Extra Time" Sports Hall, Louisalei 24, Hoboken
Charles Krijnen, Burgemeester Jansenstraat 10, NL-5037 NC Tilburg, Nederland
E-mail: bvc.shellshow@planet.nl Tel. 31 (13) 463 0607
Website: www.bvc-gloriamaris.be/beurs_e.htm

Jun. 18-19, 2016
GULF COAST SHELL SHOW, Panama City Beach, FL
Panama City Beach Senior Center, 423 Lyndell Lane
Jim Brunner, 2511 Parkwood Drive, Panama City, FL 32405
Email: jili@knology.net Tel. (850) 215-2086

Jul. 1-3, 2016
TOWNSVILLE SHELL SHOW, Townsville, Queensland, Australia
Orchid Society Hall in Kirwan
Jack Worsfold
Email: jnw_48@yahoo.com.au

Jul. 9-10, 2016
KEPPEL BAY SHELL SHOW, Yeppoon, Queensland, Australia
Gus Moore Pavilion at the Yeppoon Show Ground
Jean M. Offord, 277 McDougall St., N. Rockhampton, Qld. 4701, Australia
Tel. 61 (7) 4928-3509

Jul. 27-31, 2016
CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION, Chicago, IL
Crowne Plaza Chicago O'Hare Hotel, 5440 River Road, Rosemont, IL 60018
Katarina Frost
E-mail: 2016COA@gmail.com Tel. 847-458-7000.
Website: www.conchologistsofamerica.org

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2016-10-12

Shelling the Pearl Islands of Panama

Vicky Wall

***Macrocypraea cervinetta* and *Conus purpurascens* were just two of many species I hoped to find on my first Panama trip. Photo by the author.**

Since 1988 I have been fortunate to go on several shelling trips, but only during the summer due to my job as a high school biology teacher. After retiring last year I could finally go on a minus-tide shelling trip during the winter, specifically to the Pearl Islands of Panama. From 18-24 January 2015, 8 North Carolina Shell Club members headed to Pacific Panama: NC residents Everett Long, Ed Shuller, Jeannette Tysor, Susan O'Connor, Bill Bennight, and myself, and our two club members from Florida, Charlotte Thorpe and Alan Gettleman. Everett, Charlotte, and Alan started working on this trip back in September, checking out maps and arrangements for boat trips to various islands in the area. Everyone but myself had been to Panama before so the hunt was on for new places to explore. Everett arranged for the use of a boat for the week, the *Relampago,* maintained by a very friendly Captain and his first mate.

Our flight to Panama was uneventful, however, not so for our arrival at the hotel on Isla Contadora. First we took a harrowing van-taxi ride through Panama City traffic to get to the marina. There didn't appear to be any designated traffic lanes. It was a massive game of chicken or as my son would say, "mom, you have to own the intersection." The problem is that everyone in Panama City tries to own the intersection! At the marina, we met our boat for our 2.5 hour trip to Isla Contadora. The owner of the boat was from Panama, but had attended Lenoir Rhyne University in Hickory, NC…what a small world! Our boat was good sized but it sure didn't look like it could hold 8 people plus 16 pieces of luggage and 8 backpacks. Our captain and mate made it all fit and it was a comfortable ride. Upon arrival at our island, the first thing we noticed was the absence of a dock. To get to the beach, we were transferred, along with our luggage, to smaller water taxis that got as close to shore as possible, but we still had to wade in the water to get to shore. Depending on one's height, this could be knee-deep or waist-deep. Susan is the shortest one in our group and she was a good sport about it all. I wish I had gotten a picture of our departure from the small boats but the cameras were inside my backpack and I was trying hard to keep that over my head and out of the water, along with my shoes. Once on the beach, we had a steep walk up concrete and wooden stairs to get to our rooms. Our porters were amazing, carrying our heavy bags from the water up those stairs for us. Once we got situated in our rooms, it was close to dinner time. We had a few minutes so Charlotte and I went down to the beach to see what we might find. In just minutes exploring the rocks we found *Littorina modesta*, *Nerita funiculata*, and *Siphonaria gigas*. As this was my first trip to Panama, every shell was new for me so finding several species right away was exciting.

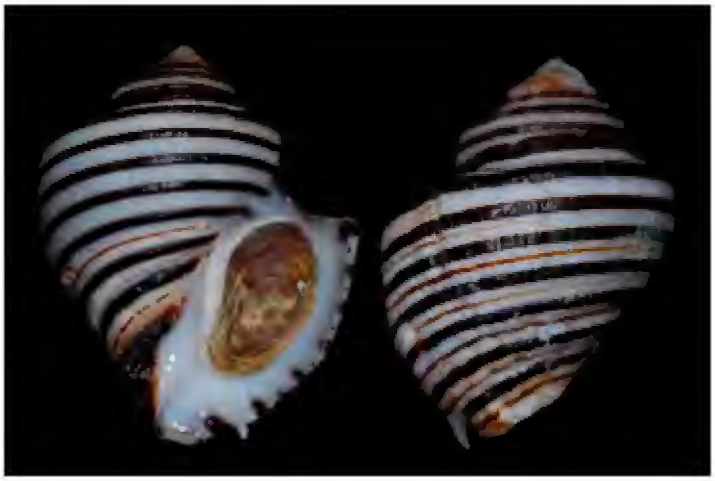
The next day we headed out early for Isla Mogo Mogo (of TV's Survivor Fame). This was an amazing place, with sand flats, tons of rocks to turn, and good snorkeling. I didn't know where to start! Aside from Guaymas, Mexico, my other shelling trips didn't include very much rock turning, but here in Panama, literally every single rock had something hiding underneath. Some of the many species found included *Conus gladiator, Conus princeps, Conus purpurascens, Bursa corrugata, Cerithium adustum, Chiton stokesii, Macrocypraea cervinetta, Tegula picta, Turbo saxosus*, and *Opeatostoma pseudodon* (with unusually long aperture spines). One of my favorite finds was on a second take. I had put a rock back but then thought I'd take another look at what appeared to be just a scaly part of the rock. It turned out to be *Crucibulum umbrella* with a beautiful lavender interior. The cowries were the toughest for me to see. Everett asked me if I had found any yet and when I said no, he said he'd help me out. Everett is the "Rock Whisperer".

He surveyed a couple of rocks and then told me to turn "that one". Well, "that one" had a cowrie underneath. The other one didn't. As the tide came in we started to find murex coming out of the sand in between the rocks. Finding my first *Hexaplex radix* was a thrill as that was one of the shells on my "Panama Wish List". Charlotte had told me that I would find lots of them. I believed her but was still amazed at the number. All of us were able to find enough to choose the best specimens to keep and then return the rest. The children and adults we met along the way use the various murex species as a food source, so they were very adept at finding them quickly. Other species we found were *Hexaplex princeps* and *Hexaplex regius*. While snorkeling, Ed and Jeannette found three amazing *Homalocantha oxyacantha* and two *Neorapana muricata* with beautiful deep orange apertures. Ed and Bill found several *Jenneria pustulata* living at the base of corals. Charlotte was the first to find large *Vasum caestus* in about 5 feet of water. They blended in well with the sand but after seeing hers, it became easier to spot them on the bottom.

The Pearl Islands received their name from the pearl industry dating back to the 1400s. One of the most famous pearls in the world was found by a slave in 1513, the 55 carat, tear-drop shaped La Peregrina (Spanish for pilgrim). Owned by several royal families over the centuries, this pearl was purchased by Richard Burton for Elizabeth Taylor in 1969 for $37,000. In 2011 it sold for 10.5 million dollars! I was fortunate to be able to see this pearl at the Smithsonian Institution in Washington D.C. when Ms. Taylor offered it on loan for their Pearl Exhibit. It was absolutely breathtaking. Needless to say, after finding several pearl oysters, *Pinctada mazatlanica*, I checked each one carefully for a pearl. I really wanted to be able to tell my husband that I was able to pay for my trip plus some with my pearl! None of us had such luck, but we did have those beautiful shells to take home.

On Wednesday, we headed to another island, Isla Casayeta. Here is where we experienced what a true minus tide is and how fast the water can recede! Our captain and his mate anchored our trusty *Relampago*, and I'm not positive, but I think the water depth was 4 or 5 feet. We were ferried to shore in small boats that met us at our boat. Alan and Charlotte headed into the village to see if there were any fishermen who had shells they would want to sell. The plan was to stay just a little while and then head to another island to catch low tide. While we waited for Alan and Charlotte to return, we checked out the rocks and shoreline for shells. It couldn't have been more than 20 or 30 minutes when I turned around to look at our boat. At that moment, it leaned over and I saw Everett slide off the back of the boat into the water, landing on his feet. Right behind Everett our poor captain and his mate jumped into the water. Our 5 foot anchoring depth was now less than a foot and the *Relampago* was stuck in the mud (relampago is Spanish for lightning,

Exposed rocks at low tide in Panama, a shellers dream. L-R: the author, Jeanette, Charlotte, and Ed. Photo by Alan Gettleman.

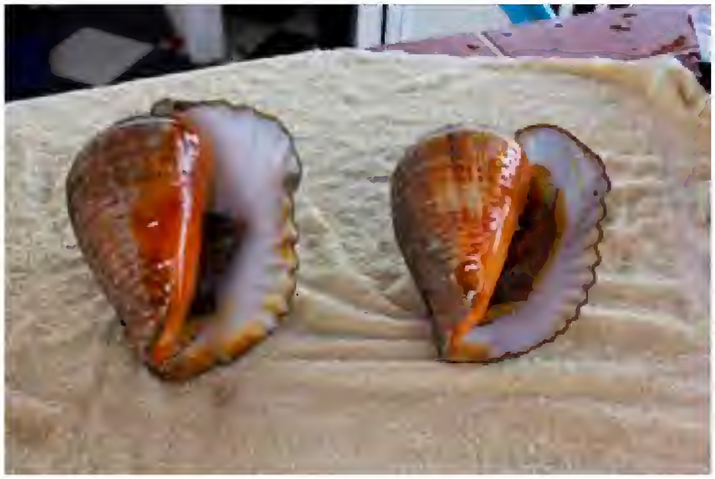


Opeatostoma pseudodon **is by no means rare, but I was still thrilled to collect this beautiful shell. With the periostracum intact it is brown with black spiral lines. Photo by author.**

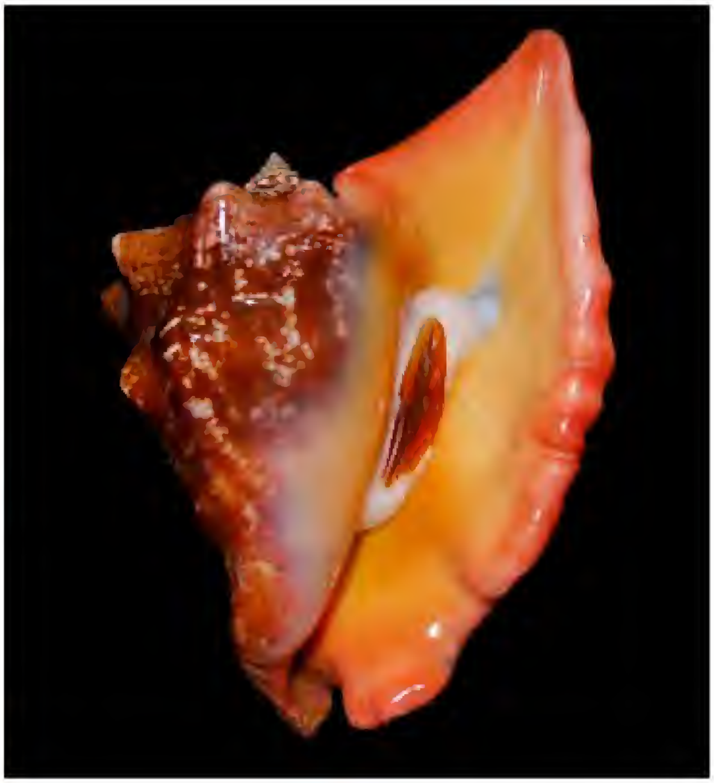
Our shell cleaning station with electricity, sink, running water, and loads of counter space. L-R: Everett, Bill, Charlotte, Jeannette & Ed. Photo by author.

An ignoble afternoon for our boat, the *Relampago*. No harm was done (except maybe the captain's pride) and the collecting was great. Photo by author.

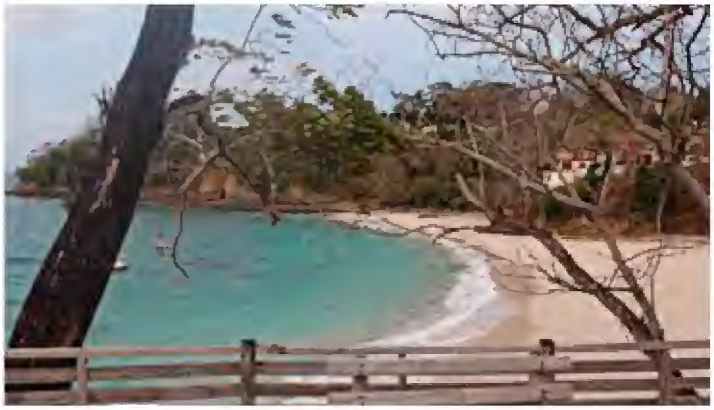
Although it might look like a miracle, that is actually Susan collecting during an extremely low tide. Photo by Alan Gettleman.



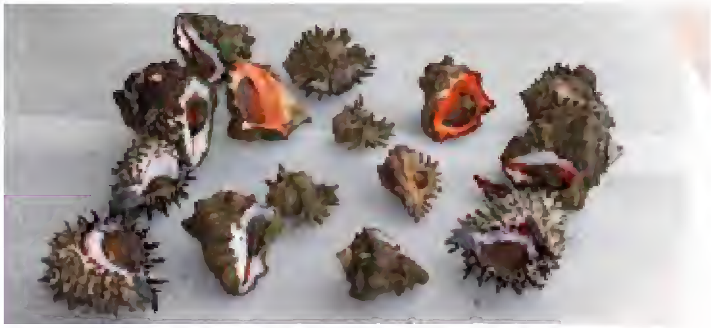
Lobatus galeatus collected by Ed and Jeanette. Photo by Jeanette Tysor.



Lobatus peruvianus with the vivid coloring only found in freshly caught individuals. Photo by author.



The beach at our hotel on Isla Contadora. Photo by Jeannette Tysor.



Ed and Jeanette found these *Hexaplex radix*, *Vasum caestus*, *Neorapana muricata*, and *Homalocantha oxycantha*. Photo by Jeanette Tysor.

which at this point was very sad!). If I had known this was going to happen and had shot a video, I know it would have been a hit on YouTube. I felt badly for our captain and mate, as they were really embarrassed that they hadn't kept an eye on the tide. Alan was able to speak with them in Spanish, reassuring them that everything was fine and that we were not angry with them. Thank goodness there was no damage to the boat. Everett, with his agile slide off the boat, was the subject of some good ribbing the rest of the week. Our poor *Relampago* looked like the SS *Minnow*, but not a problem. We just continued to shell as we waited for the tide to come back in and right our boat. Everett and Susan had a good time checking out the shell piles and bartering for shells with a very enterprising 10 year old. It was fun to watch as he and Everett sparred back and forth over the price of some spiny oysters. We enjoyed sitting with the local folks, even if communicating was a challenge. One older man was disappointed that we didn't have any cigarettes. Everett had some candy that he brought for the children so he shared some with that man, which he enjoyed very much.

Back at our hotel our daily routine consisted of shelling until the late afternoon, then time to clean shells, eat dinner (the local restaurants were great and within walking distance), and get some rest for the next day. Leave it to Everett to find a primo place for cleaning shells…an unused outdoor bar area with electricity, sink, running water, and loads of counter space on which to work. He checked with the hotel desk and the young American tour director there said it would be fine for us to use that space. In fact, she was very interested in what we were doing and what shells we were finding. This particular hotel was getting back on its feet after being vacant for several years. I imagine our cleaning station will once again be used as an outdoor bar and seating area someday, but for our week, what a find!

Our last day of shelling was the most exciting. And as "Murphy's Law of Shelling" would have it, one of the most productive. It was a long afternoon and night cleaning and packing shells for the trip home the next day. We arrived at Isle Bayoneta for another great low tide. Two species on my wish list were still elusive, the beautiful tented olive *Oliva porphyria* and the large conch *Lobatus galeatus*. Earlier in the week I found a fresh dead juvenile *Lobatus galeatus* but none of us found any of the olives or mature conchs. Time was running short so we fanned out among the rocks and got to work. Here is where I finally found one of my favorites, the thorn latirus, *Opeatostoma pseudodon*. They were grouped underneath rock ledges and in crevices. If we had to leave at that moment, I would have left with a smile, as it had been such a wonderful week, but we weren't finished yet. As the tide was slowly coming back in, things really got hopping. As I was picking my way among the rocks I found a mature *Lobatus galeatus* and then in two more steps, I found another. I couldn't believe it! As my students would say, OMG! I never would have thought such a large shell could fit and maneuver among the rocks. Then Jeannette said she found one and then a second one a few minutes later. The best moment was with Alan. He was wading in knee-deep water several yards ahead of us when he waved his hand above his head holding a *Lobatus galeatus*, the prettiest one of all. Not to be outdone, as Everett was walking along the water's edge, probably thinking we had lost our minds, he casually reached down and then asked, "what do you think about this?" He had found a beautiful *Lobatus peruvianus*! They were popping out of the sand too. I found two juveniles, that I left, and then two mature specimens. I believe Ed and Jeannette found several, as did Everett and Charlotte. What a great way to end the trip. For the week, we found 110 different species of mollusks.

Our group getting ready to board the *Relampago*: (back) Vicky Wall, Bill Bennight, Alan Gettleman, Ed Shuller, (front) Charlotte Thorpe, Susan O'Connor, (boat owner), Jeannette Tysor, Everett Long. Photo by boat captain.

Saturday was "going home" day. Once again our porters were amazing, carrying 50 pound bags on their shoulders for the trip down the steps to the beach, and out to the waiting water taxis. This time we were old pros and were ready for the short wade out to the boats - shoes off, pant legs rolled up! What we weren't ready for was moving from the water taxis to the *Relampago* in pretty rough water. Thank goodness the water was much calmer in the next cove for the transfer. The 2.5 hour trip back to the mainland had calmer seas than the previous week. I struggle with motion sickness, but not this time. It was such a relief to be able to talk with everyone and take photographs and not feel sick. As we neared Panama City, we saw lines of huge transport ships waiting their turn for passage into the Panama Canal. Also waiting was a military frigate. The soldiers waved to us as our captain drove our boat around theirs. I hated to see our time in Panama end. It was great to spend time with old friends and make new ones. I hope there will be many more opportunities in the future to go shelling with such great people.

Vicky Wall
vwall3@embarqmail.com

Panama species list

Acanthais brevidentata (Wood, 1828)
Anachis fluctuata (G.B. Sowerby I, 1832)
Anachis pardalis (Hinds, 1843)
Anachis rugosa (G.B. Sowerby I, 1832)
Anadara tuberculosa (G.B. Sowerby I, 1833)
Arca mutabilis (G.B. Sowerby I, 1833)
Arene fricki (Crosse, 1865)
Axinactis inaequalis (G.B. Sowerby I, 1833)
Bailya anomala (Hinds, 1844)
Barbatia illota (G.B. Sowerby I, 1833)
Barbatia lurida (G.B. Sowerby I, 1833)
Barbatia reeveana (d'Orbigny, 1846)
Bursa corrugata (Perry, 1811)
Cantharus sanguinolentus (Duclos, 1833)
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“Molluscan Communities of the Florida Keys and Adjacent Areas: Their Ecology and Biodiversity”

by Edward J. Petuch and Robert F. Myers

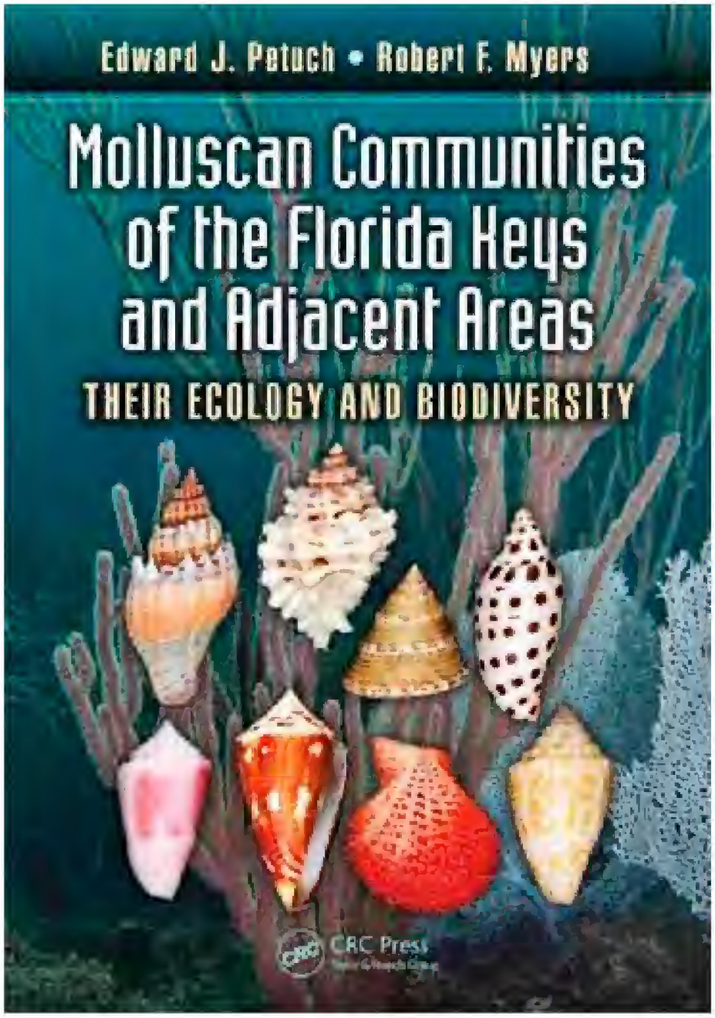
Published 2014, CRC Press - Taylor & Francis Group, Boca Raton, Florida, ISBN 13: 978-1-4822-4918-7 in hardcover with laminated board case binding, 299 pp., illustrated in high color resolution photographs by Robert F. Myers, about $120

Review by David P. Berschauer
shellcollection@hotmail.com

This book is organized and arranged by habitats, the way a field collector or ecologist would approach a collecting trip or expedition rather than the traditional taxanomic hierarchy. The authors lead the reader through an exploration of twenty different marine ecosystems from the Palm Beach region south through the Florida Keys, across the Dry Tortugas, and through the vast Ten Thousand Islands region - an area encompassing the southern extreme of the Suwannean Molluscan Subprovince of the Carolinian Molluscan Province and representing an ecological transition zone. This book is unique by being the first book on mollusks of the greater Florida Keys region organized by marine ecosystems and their associated molluscan assemblages arranged by the CMECS (Coastal Marine Ecological Classification Standard) system.

More than 1,200 species in 140 families are noted from the study areas, with large glossy color plates illustrating over 550 of the region’s most ecologically important species. Along with species lists for each of the twenty marine ecosystems and associated molluscan assemblages surveyed, the authors describe two new species of bivalves in the families Pectinidae and Arcidae, and ten new gastropod species in the families Muricidae, Buccinidae, Nassariidae, Naticidae, Turritellidae, and Olividae. Finally, for the land snail enthusiasts there is a chapter on the endemic tree snails of the Florida Keys tropical hardwood hammocks, with rich illustrations of many of the rarest subspecies and forms.

I found this book to be both an enjoyable read and a useful and valuable reference guide. If you collect shells or ever plan to collect shells in Southern Florida this book is a fantastic addition to your shell library.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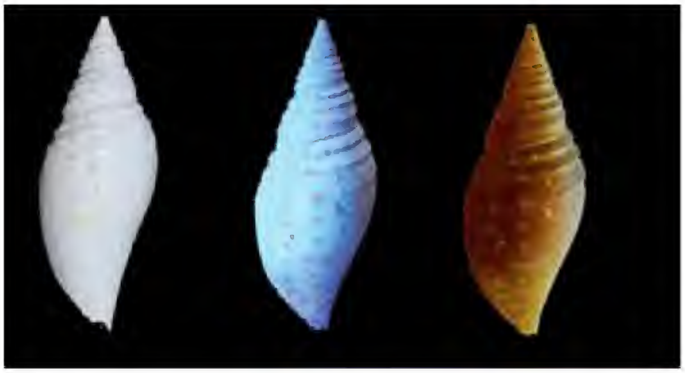
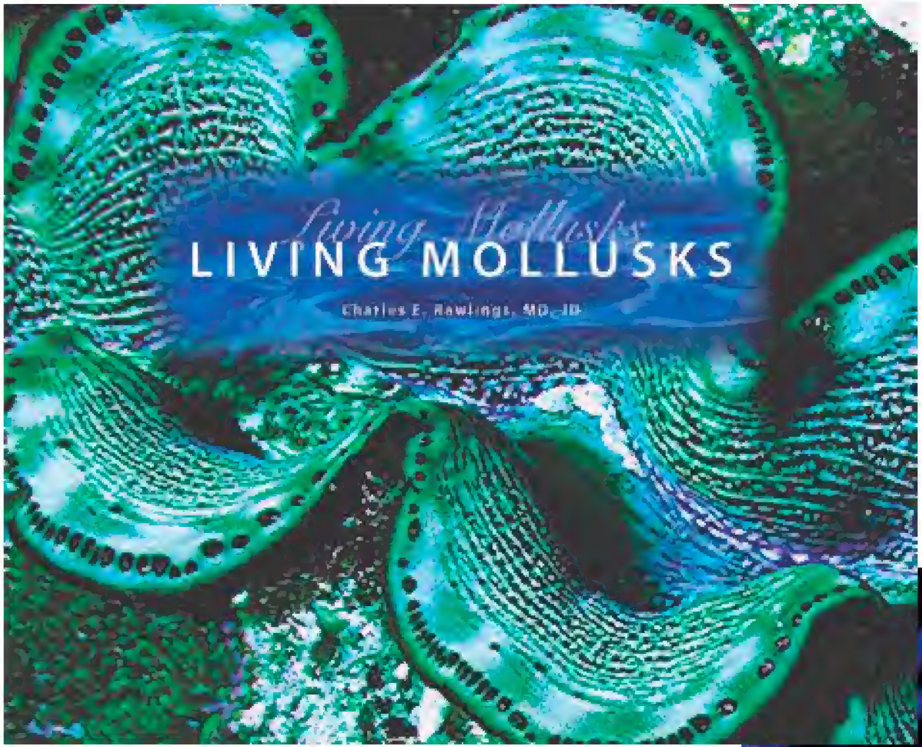


A different way to use UV images

A Florida Pliocene fossil from the Caloosahatchee Formation, *Pleioptygma carolinensis* (Conrad, 1840) 55mm. On the left is the shell in normal light – some pattern can be seen. In the middle is the same shell under ultraviolet (UV) light – the pattern is much more evident. On the right is the same shell in a negative exposure of the UV image. We will never really know what these fossils looked like in life, but this is an interesting presentation of a possibility. Editor.



Living Mollusks

by Charles E. Rawlings, MD, JD

Published 2015by Peppertree Press, LLC.,
Sarasota, Florida.
ISBN 978-1-61493-365-6
hardcover, 11 x 14 inches, 179 pp.
In excess of 150 high resolution, full page photographs
$49.95, or if combined with "Living Shells", $69.95
http://www.livingmollusks.com

Charles Rawlings is well known to COA. His photographs have graced dozens of *American Conchologist* covers and he is the recipient of the 2014 *Neptunea* Award. What makes his photographs so special are three things. First, he donates them to the magazine. Most photographers of this quality and breadth of coverage want to be compensated – and rightfully so as they have to pay for their photographic gear, SCUBA gear, and the flights to various places around the globe. Second, he actively seeks out specific locations that offer rare and unusual molluscan subjects. A number of his photographs have been the first ever of a species *in situ* and I'll never forget the images he took while swimming with feeding Humboldt squid at night. And we get these free for the magazine. Last, when he is under water, the doctor and lawyer take backseat to the artist. His images are well-framed and composed (not an easy task as anyone who has taken underwater photos will tell you) and sometimes downright astounding.

Charles published "Living Shells" in 2010 (reviewed in this magazine in Dec 2011). The format is similar to this volume, though it is only 129 pages. It is a large colorful book where the living shells are sometimes enlarged many, many times. His image of *Conus gloriamaris* crawling at night in the sand is slightly more than 20 inches in length. That is the animal and shell, not the double page size. There is something to be said about an image of a *Pleurotomaria* or *Harpa costata* that is the size of a football (and probably the first ever *in situ*). So enough! What about this new book.

Living Mollusks is similar to *Living Shells* in the large high quality images with many species you will have never seen before as living animals. It is however, larger and a bit cleaner in format and ease of use than the first volume. He now has easily visible page numbers on every page (past the table of contents) and a comprehensive photograph index at the back. Another nice thing (carried over from the first volume) is the chapter: "First Photographs". These are critters photographed only as dead, dried shells prior to this. Another chapter is: "One of a Kind". These are not necessarily rare species, but rather images of species that are unusual and not likely repeated elsewhere. And he has, "Abstracts and Eyes" - a chapter of images that struck him as odd-looking, well-patterned, or just strangely interesting. His other chapters are based on molluscan families (i.e. slit shells, volutes, cowries, cones, murex, bivalves, etc. - a total of 14 chapters) and a couple groups not addressed in many shell books - cephalopods and nudibranchs.

There you have it. This is a fun book with many amazing images. I have both volumes and consider them a valuable addition to my shell library. Too often we get hung up in the rigors of taxonomy and shell identification. Charles lets us enjoy the living beauty of our collections and then some.

COA Award winners
2016 Broward Shell Show

Broward Co., FL – 16 Jan 2016

Jim & Linda Brunner with "Muricinae: Beautiful Carnivores," winners of the COA Award.

The annual Broward Shell Club Shell Show was held in the spacious Pompano Civic Center. We had a good crowd and added double digit numbers of new club members! This year's winners of the COA Award were Jim & Linda Brunner with a display titled "Muricinae: Beautiful Carnivores." This intriguing display showing the life styles and habitats of this muricid subfamily was 25 feet long in 12 cases. Not much was left out. Truly a remarkable effort by the Brunners.

Shell Show Chairperson was Alice Pace and the Scientific Judges were Bill Lyons and Richard Goldberg. Other notable winners were:

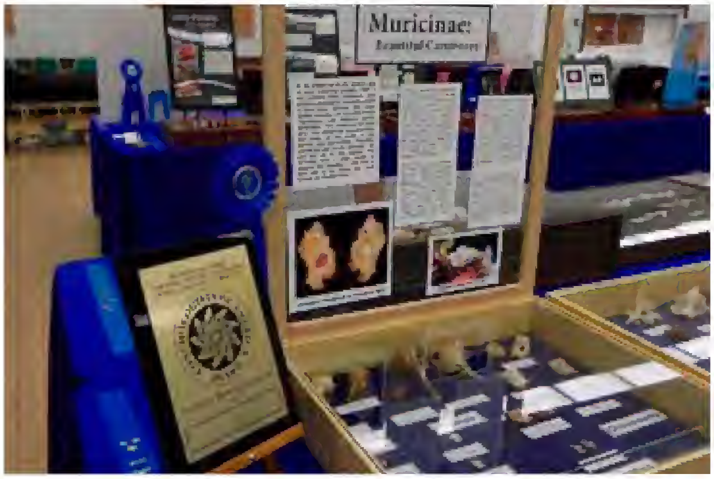
DuPont Trophy & Leonard Hill Memorial Trophy to Martin Tremor Jr. & Conrad Farler for their display, "Trachycardiinae - the Elongated Cockles."

American Museum of Natural History Award to Gene Everson for his display of "The Genus *Semele*."

Shell of the Show (self-collected) to Linda Zyman for *Timbellus phyllopterus*.

Shell of the Show (any manner) to Greg Curry Jr. for *Voluta* (*Tenebrincola*) *cukri*.

In all there were 238 feet of display cabinets and over 2,000 attendees. Well done to the Broward Club.



Part of the Brunner's COA Award winning display "Muricinae: Beautiful Carnivores."

DuPont Trophy & Leonard Hill Memorial Trophy to Martin Tremor Jr. & Conrad Farler for "Trachycardiinae - the Elongated Cockles."

Shell Show Judges (L-R): Richard Goldberg, Emily Savage, Anne Joffe, & Bill Lyons.

COA Award winners
2016 Astronaut Trail Shell Show

Brevard Co., FL – 9-10 Jan 2016

Alan Gettleman

The COA Award is presented to Gregory Curry, Sr., (L) of Key West, Florida, for a display of the genus *Amoria*. Judges: Harry Lee (R) and Homer J. Rhode III (M).

The DuPont Trophy was won by Anne Joffe of Sanibel, Florida, for an extensive 48 foot display titled "Mollusk General Hospital", with aberrant, damage-repaired, and freak shells.

The Master's Trophy was won by Gene Everson of Louisville, Kentucky, for the Family Turbinidae.

Formed during the height of the Apollo program and race to the moon, the Astronaut Trail Shell Club celebrated their 50th year as a club with their 36th shell show January 9-10th. Well known shell dealers Don and Jean Pisor of San Diego, charter members of our club, were in attendance.

Scientific judges were Harry G. Lee, M.D., and Homer J. Rhode III. Artistic judges were Linda Koestel and Amelia Ann Dick. Major scientific awards were the Conchologists of America (COA) Award to Gregory Curry, Sr. of Key West, Florida, for a display of the genus *Amoria*. The DuPont Trophy was won by Anne Joffe of Sanibel for an extensive 48 foot display titled "Mollusk General Hospital", with aberrant, damage-repaired and freak shells. The Master's Trophy was won by Gene Everson of Louisville, Kentucky for the Family Turbinidae. The R. Tucker Abbott Award of the club was won by Vicky Wall of Mayodan, North Carolina, for a self-collected display of "Your Going Where?"

The Shell of Show was *Stellaria lamberti* (Souverbie, 1871) by Vicky Wall. Both World Wide Self-Collected Shell of Show, *Cassis tuberosa* (Linnaeus, 1758), and Florida Self-Collected Shell of Show, *Scaphella junonia* (Lamarck, 1804), were by Pat and Bob Linn of Dunedin, Florida. Junior Scientific Trophy went to "First Shelling Trip. . ." by Collin and Karsyn Redding of Palm Bay, Florida.

The Arts & Craft Premium Trophy: Victoriana by Charles Barr, Rockford, Illinois; the Arts & Crafts Trophy: Water Lily Single Sailor's Valentine by Hatsue Iimero, Hokotu, Yamanashi, Japan; the Arts & Crafts Collectible Trophy: Leper Doll by Charles Barr; and the Junior Arts & Crafts Trophy, "Seashells Skating to the Beach" by Melissa Linn, Indianapolis, Indiana.

The club is changing their venue and date for the 2017 show, which will be January 21-22 at the Eau Gallie Civic Center in Melbourne, Florida. Our show will again be one week separated from the Broward Shell Show so those wanting a mid-winter break can vacation in Florida and visit two shell shows on adjoining weekends.

2016 COA Convention Chicago, IL

27-31 July 2016

(25-26 July: pre convention field trips, 1-2 August: post convention field trip)

It's time to start seriously planning on attending the 2016 COA Convention in Chicago.

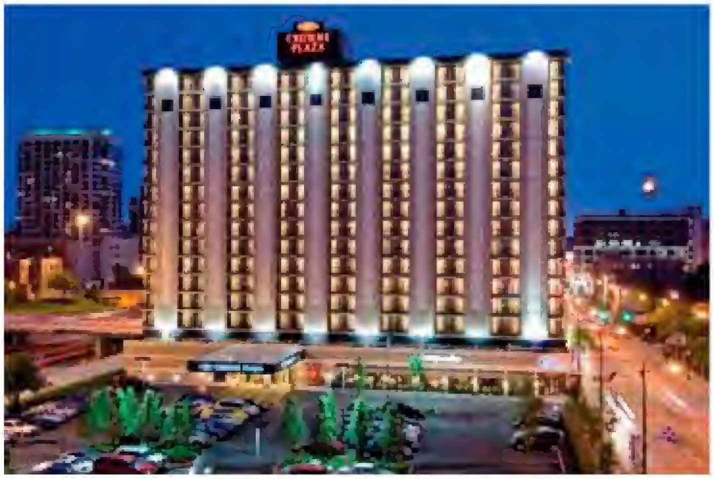
The Crowne Plaza in Rosemont, Illinois, will be home to the Conchologists of America annual convention just minutes from Chicago O'Hare International Airport. On Monday and Tuesday (25-26 July) there are pre-conference field trips. The conference convenes Wednesday morning and concludes with the Bourse on Saturday and Sunday.

There is a free shuttle to the hotel, so no need to rent a car. There are many restaurants in the area and the Fashion Outlets of Chicago just out the back door. Room rates are $148 (plus tax) for single occupancy, which includes free parking, WiFi, fitness center, and breakfast. Double occupancy is $158 (plus tax) {$10 for the 2nd breakfast} and $248 (plus tax) for suites. These rates are available for 3 days before and 3 days after the Convention.

For hotel reservations, call Toll Free: 888-233-9527, international callers call 847-671-6350 or go to: https://goo.gl/nhuhJC. Reservation code is Conchologists of America. Deadline for convention rate is July 6, 2016. If you cannot find your registration forms, go online to: www.conchologistsofamerica.org. Everything you need to register can be found there.

The 2016 COA Convention will be a family event. We encourage you to bring your spouse, children, and grandchildren – there is so much to do in Chicago. There is a shuttle that will take you to the "Blue Line," which takes you right to downtown Chicago. The list of museums and things to do is more than anyone can do in a week. Some highlights include:

*Chicago Art Institute
*Blues Concerts and Dinner
*Grant Park Symphony Orchestra
*Millennium Park (see the famous "Bean")
*Adler Planetarium
*John G. Shedd Aquarium (pre-convention field trip planned)
*Field Museum of Natural History (pre-convention field trip planned)
*Museum of Science and Industry (pre-convention field trip planned)
*The Lincoln Park Zoo
*The Magnificent Mile (shop until you drop!)
*Fabulous restaurants to please all
*and much, much more!


Chicago's Crowne Plaza

How many opportunities will you have to eat dinner under *Tyrannosaurus rex.*

The welcome party will be held at the Field Museum of Natural History, right under Sue, the best preserved and most complete *Tyrannosaurus* ever found. If you get here a bit early (25-26 July) you can get a behind-the-scene tour of the Field Museum, take a river cruise to learn all about the city's architecture, sail on Lake Michigan on the *Mystic Blue* and watch the city skyline (plus great food and drinks), or hang around after the convention (1-2 Aug) to go on a collecting trip to the Mississippi River. If you do not partake of any of the pre- or post-convention trips, you will still enjoy a stay in a classy hotel, great food, lots of folks you know (some you may even like!), get inundated with shell-related talks, bid on that perfect find in silent and oral auctions, and finally wander the world famous COA bourse on Saturday and Sunday.

Come to Chicago!

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CHICAGO

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ISSN 1072-2440 Vol. 44, No. 2, June 2016

thomas@nerite.com www.conchologistsofamerica.org

American CONCHOLOGIST

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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Editor's comments: First a bit of business. The slate of COA officers for 2016 was published as required by our by-laws in the September 2015 issue. In case anyone missed it and just as a reminder prior to the election during our Chicago convention, it is repeated here.

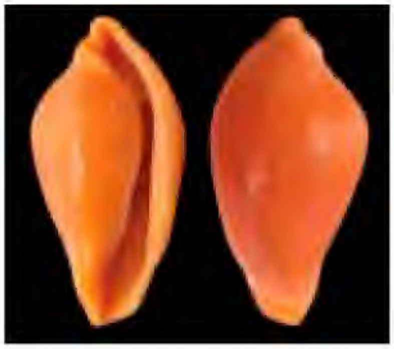
A nominating committee consisting of Doris Underwood, Everett Long, and Alan Gettleman was established to report a slate for the elected offices to be voted at the 2016 annual meeting of the Conchologists Of America (COA) convention to be held in Illinois. The proposed slate of officers is:

President: Harry G. Lee, M.D.
Vice President: Wayne Humbird
Secretary: Phyllis Gray
Treasurer: Steven Coker
Trustee: Everett Long

That out of the way, I hope you enjoy this issue. As usual we have an eclectic offering, from filming living mollusks to raising minute land snails. Of course, the major event on the horizon is the COA convention in Chicago. The folks in the windy city have pulled out all of the stops to make this a memorable event. Yes, you should already have your reservation set, but it is really never too late. The COA convention is a once a year opportunity to mix and mingle with shell folks from around the world. This event is guaranteed to increase your enjoyment of conchology. Really! If not, see me in Chicago and I'll buy you a drink.

Tom Eichhorst

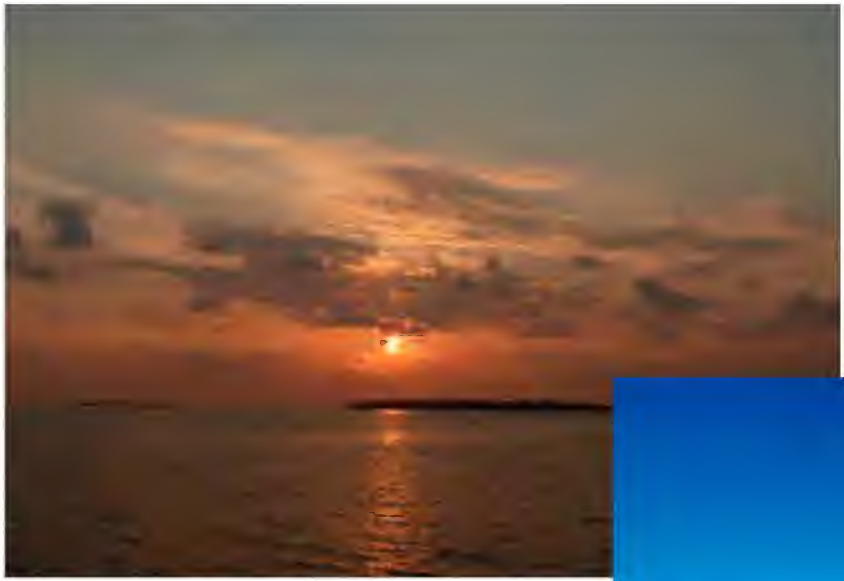
Front cover: *Cuspivolva tigris* (Yamamoto, 1971), photographed by Charles Rawlings at night on soft coral, Ambon, Indonesia. This beautifully marked ovulid is fairly wide-spread throughout the Pacific, but never really commonly found. Originally named *Primovula tigris* by Yamamoto, it was subsequently placed in *Crenavolva*, and most recently moved to *Cuspivolva*. The brightly colored orange mantle with black stripes outlined in white covers a shell that is uniformly yellow to orange with a bit of darker shading around the aperture.



Back cover: *Empleconia vaginata* (Dall, 1891), 30mm, in mud at 350 meters, trawled by the "Northwest Explorer," off Kodiak Island, Alaska, by Scott Walker, June 2015 (ex. Will Ritter, May 2016). Originally named as *Limopsis vaginata* by Dall, subsequently moved to *Empleconia* (one of eight genera in the family Limopsidae). If the "hairy" periostracum is removed, the collector is left with an unremarkable white shell.

Adventures in producing a documentary: "HEALERS AND HUNTERS: THE SECRET LIFE OF SEA SNAILS"

Astrid Koch (images © Duino Film, 2015)



Palm fringed islands with pristine sandy beaches…for most people, this is a slice of paradise.

The infinite blue sea is perfect for swimming, but few people are aware of just how many dangerous, even deadly, animals lurk beneath the surface.

Most notorious are the venomous lionfish, stonefish (shown here), moray eels, and the poisonous puffer fish; but often it's the seemingly innocent that are the most treacherous.

As an avid diver and shell collector, I am always looking for snails when I travel to tropical islands. Cone snails are especially interesting when it comes to research as well as documentation. A lot of good images can be captured while diving and snorkelling along the shore and in tide pools. Since cone snails are mostly nocturnal, we spent many hours in shallow waters wielding flashlights.

Most cones were found around midnight. Of course, filming during the night is difficult, which is why we collected our findings in plastic nets and proceeded to film them under more favourable conditions, such as clear water, a slower current, and smaller waves. Nevertheless it is still difficult to film such a slow-moving animal. A single turn by a crawling cone snail often took several minutes, requiring patience and persistence to film the snail's movements. Holding them in a small space enabled us to get images of *Conus bandanus* hunting. While under observation, it preyed on other toxic cone snails.

***Conus bandanus* relocated with us to Vienna.**

Unfortunately our plans were too ambitious for the time we had, so we decided to take *Conus bandanus* back with us to Vienna. We wrapped it in moist washcloths to enable it to survive the flight unharmed. Back in Vienna we carefully unpacked our special "souvenir" and proceeded to slowly accustom it to the water in our research tank.

It took a few minutes for it to extend its foot and begin to smell with its olfactory organ. Shortly afterwards, it started to leave trails of mucus in our aquarium. We were able to closely observe and film the beautiful patterns on the shell and body.

Conus bandanus gave us a lot of good imagery of its hunting method. We managed to capture the venom canal stretching, the prey getting shot by its venomous harpoon and 'reloading,' and repeatedly shooting time and time again. In nature, capturing this material would have been almost impossible!

One of our research aquariums.

It is hard to obtain marine snails in a country without a sea-side…Austria

For months we tried to get our hands on living cone snails from various sellers, but to our disappointment, only *Strombidae* were available. In a very fortunate turn of events, we got a call from an animal shop owner in Linz, who informed us he had just received several cones, despite not having ordered them! We were suspicious at first and asked for proof in the form a photo. We could barely believe our eyes when we received a photo of a bucket containing more than 50 cones! A *Conus geographus* seemed to be the most active by far and caught our eye.

A bucket with over 50 live cone snails.

We were excited on the 200km trip to Linz, for we could take a true treasure trove with us back to Vienna. We purchased the cones and headed back to Vienna. They arrived alive and in good shape, but we knew they could not remain in their temporary home for long. Even though the best efforts were made to make the best out of it, the bucket was far too small. We hastily prepared three 100 litre tanks, as well as several smaller research tanks for the less active among them and, if that wasn't enough, two filtered tanks. We had no clue as to how active the animals would be, which meant we were uncertain when it came to adding lids, or whether or not they would start preying upon each other, but we were confident that separated tanks would prevent many such problems. It took us until midnight to put all of the snails in their respective new homes. We tried to keep related kinds together, for example *Conus mustelinus*, *Conus vexillum* and *Conus capitaneus* were put into one tank.

Stack of three research aquariums.

Predators like *Conus geographus*, *Conus textile*, *Conus pennaceus*, and *Conus magus* were kept together in a pool without fish. Several *Conus imperialis*, *Conus miles*, and *Conus omaria* were kept together as well. All in all we had more than 50 cone snails now and it was very exciting to observe them undisturbed.

Surprisingly plenty of egg capsules in the aquarium!

Only three days later, we discovered the first eggs in our tanks and it was not just one *Conus* that had laid eggs, but nine! The first egg capsule was attached to the front glass of the aquarium by a *Conus mustelinus*. The eggs were near the top and surrounded by a constant flow of water. After four days, the single eggs became clearly visible, but one day later, the eggs were gone, which either meant they were taken by the current, or a brittle star got them.

Conus geographus **cruises through its aquarium habitat.**

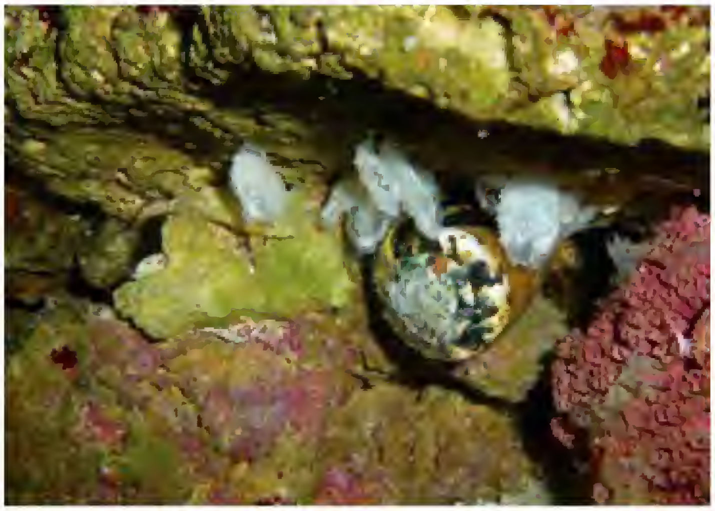
Another *Conus mustelinus* carried an egg capsule on its shell for several days. It behaving passively and remaining under stones most of the time. A couple days later the egg capsule was lost. It was found later, ripped apart.

Over the course of two days yet another *Conus mustelinus* laid more than 30 egg capsules on the bottom of a stone plate, where they were in a constant flow of water. The *Conus* itself kept close to them. Finally, we could get a good view of the development of the eggs. Every day, the eggs grew larger, while we kept our cameras on them. The eggs within the capsule looked like they were threaded on a piece of string. Apparently, they did not touch each other and seemingly had just enough space to grow in every direction. We estimated around 1000 eggs per capsule!

After a few days, brittle stars started to threaten the eggs. We tried to collect all of them, but we did not entirely succeed. One egg capsule got destroyed, but then we had the chance to take a very close look at it through a microscope. It still contained plenty of larvae. They were moving and had visible eyes and the embryonic whorl. We managed to film what we saw under the microscope. Fortunately the other capsules remained intact and were constantly guarded by the *Conus mustelinus*.

Conus miles laid 15 egg capsules on a stone plate that covered the hole of two gobies, about 14 days after we brought the snails to Vienna. Was that on purpose? Did *Conus miles* know that the gobies created a small current around the eggs by leaving and entering their hole? The eggs developed nicely and we got a lot of wonderful pictures of the gobies who seemed like little guardians for the eggs.

Conus vexillum created a nest of 18 egg capsules at roughly the same time, but it was destroyed after a few days by a *Conus geographus*. It crawled repeatedly over the capsules and ripped the thin hulls apart. It looked like it went for the larvae, so we thought it was not only preying on



***Conus mustelinus* with eggs.**

other snails, but also on their larvae.

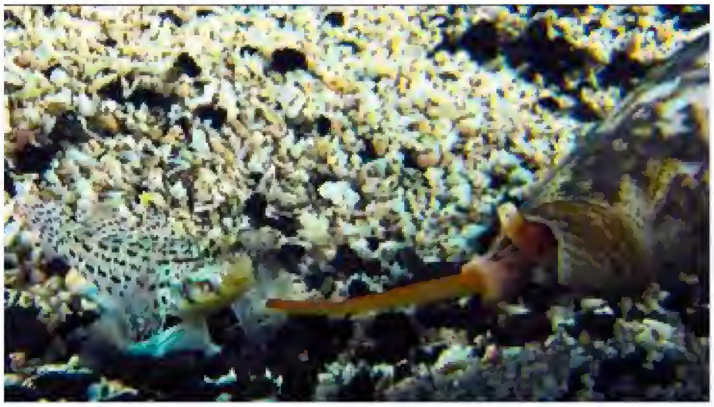
We were only able to view a female *Conus mustelinus* laying eggs and the much bigger male crawling over them to fertilise the eggs once. The process took several hours and took place underneath a large stone at the back of the aquarium, where unfortunately we could not film.

The larvae's development takes between seven and nine days from initial laying to hatching. Despite the snails having limited neurons for mental processing at their disposal, we noticed that the places they choose for their eggs were carefully selected. All of the sites had a constant flow of water - not too little, not too much, maybe just the perfect amount for ideal development. In our case the biggest threat to them were the brittle stars, but, as noted, *Conus geographus* destroyed at least one set of eggs as well. The hulls of the egg capsules are double layered, flexible, soft, and transparent. They are often attached to stones with their thinner end, the non-attached side is round.

Conus striatus makes a successful hunt on tape

Only after multiple attempts with different fish, we found the right kind of goby that animated *Conus striatus* to hunt. In front of our camera, it first placed a shot on the gill cover, the second shot hit the goby behind its head. The predator's stomach then enveloped the fish. The fish's desperate attempt to escape failed and he was sucked deeper into the cone shell. In less than a minute, the fish had decomposed to such an extent that it could be digested inside the narrow shell. After its successful hunt *Conus striatus* dug itself into the sand and did not move for several days.

Our *Conus bandanus* from the Maldives started to hunt only after we offered it snails of the family Nassaridae, which were from the Maldives as well. After two months without eating, the *Conus bandanus* hunted and preyed upon several of these snails.



***Conus striatus* hunts a goby on film.**

***Cypraea arabica* grazes across rocks and coral in one of the research tanks.**

The satisfaction of filming Cypraeidae!

During our nightly snorkelling tours, we also discovered many different Cypraeidae, such as *Cypraea tigris*, *Cypraea arabica*, *Cypraea carneola*, *Cypraea talpa*, *Cypraea scurra*, *Cypraea eglantina*, *Cypraea caputserpentis*, *Cypraea nebrites*, *Cypraea clandestina*, and *Cypraea nucleus*. We managed to film them in their biotope and were amazed by the beauty of the patterns of their shells and the delicacy of the papillae of their mantles.

Cypraea annulus produces offspring in our aquarium

We were incredibly lucky to witness and film the mating and subsequent egg laying of *Cypraea annulus* on the front glass pane of our research aquarium. The endeavours of the male to get the attention and win the favor of the female were intriguing to watch and 13 days after mating the female *Cypraea annulus* laid her egg capsules on the front glass of our research aquarium right in front of our eyes. The fascinating observations of breeding behavior - from the front row as it were - had never been filmed like this before.

Cypraea annulus brought the egg capsules close to each other in a circle on the smooth surface. In total there were 102 egg capsules. It was impossible to count the number of eggs per capsule, but we estimated there were between 300 and 400. On the sixth day, larvae were whirling around in all of the egg capsules. Using the microscope camera, embryonic whorls and eyes could be clearly seen. We observed how the brooding mother cleaned the egg capsules by gently lifting her foot, allowing water to flow between the egg capsules and out the other side.

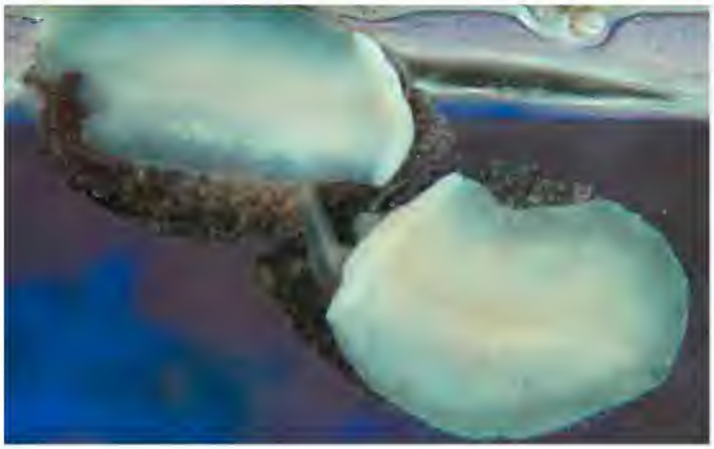
On the 9th day there was the great event, the hatching of the *Cypraea annulus*. The female proceeded to bite open the skin of an egg capsule so the young could swim away. She would then eat the egg capsule membrane and bite open the next one. After all of the larvae were released into the open water, she removed all traces of her eggs by thoroughly cleaning the glass pane. The entire process (brood care) took nine days.

Prof. Wilfried Ilias, Department of Anesthesiology, Intensive Care and Pain Therapy at the teaching hospital of the Merciful Brothers Vienna, provided an insight into the modern uses of conotoxins.

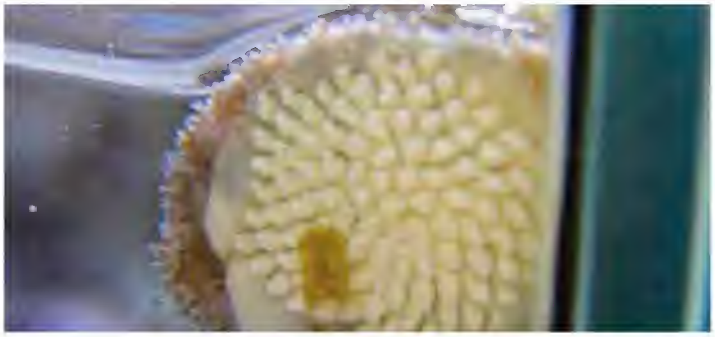
Academic advice from top scientist

Scientific advice for the first feature-length snail film was provided by Prof. Wilfried Ilias. In an interview for the film he explains the effect of conotoxin on the prey organism.

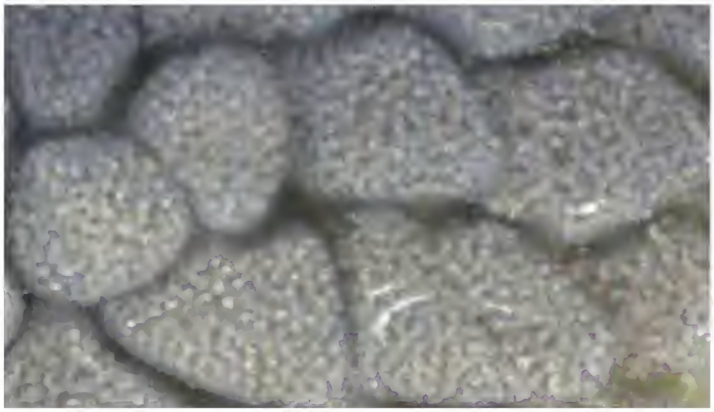
Various channel systems of muscle and nerve cells respond to the envenomation. First, the sodium channels are opened by one of the toxins. Then the victim goes into a shock-like spasmodic state, followed by paralysis of the muscles. Finally pain receptors are blocked so the victim can be consumed without feeling pain and struggling. The way they hunt, by approaching a victim with their radula extended and ready to fire, is so refined that you could almost imagine



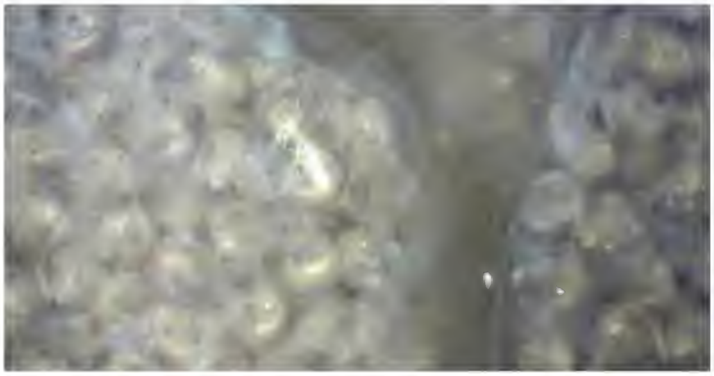
***Cypraea annulus* mating in research tank.**

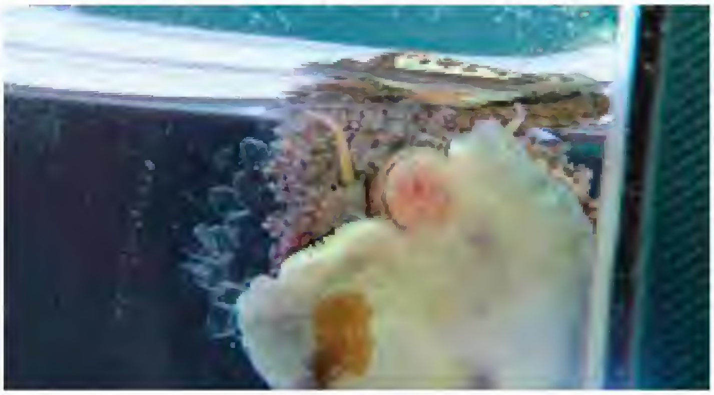


***Cypraea annulus* guarding egg cases.**



Above & below: magnified views of *Cypraea annulus* egg cases with hundreds of embryos in each egg case.





***Cypraea annulus* chewing through egg case covers to release the hatchlings.**

they have a thought out a strategy. Given the simplicity of their brains, this is obviously impossible. Survival of cone snails is due in large part to their development of a variety of venom 'cocktails' giving them the ability to hunt and subdue a variety of prey animals. Their toxins are targeted precisely at the respective nervous systems of the animals they hunt.

Cone shells are dangerous hunters that produce their venom in order to kill their prey, but now in modern medicine some of the various components of cone toxins have been isolated and are used in pain relief therapy. One is the so-called ziconotide, an omega-conotoxin. It has been ascertained that cone snails contain a variety of toxins and that the toxins vary (even within a species) according to habitat and prey. If you add up the various types, altogether there are more than 200 different toxins. These affect different channel systems of muscles and nerve cells. Currently the most researched is *Conus magus*. Its venom consists of 52 different types of toxins or peptides.

I am excited about producing a film that documents our discoveries with various mollusks and I eagerly look forward to new adventures under the sea. Until then I offer what I hope is some insight into the fascinating world of our planet's oceans and look forward to providing new and maybe never before seen pictures of this world.

Visit us at our website **www.duino-film.com.**

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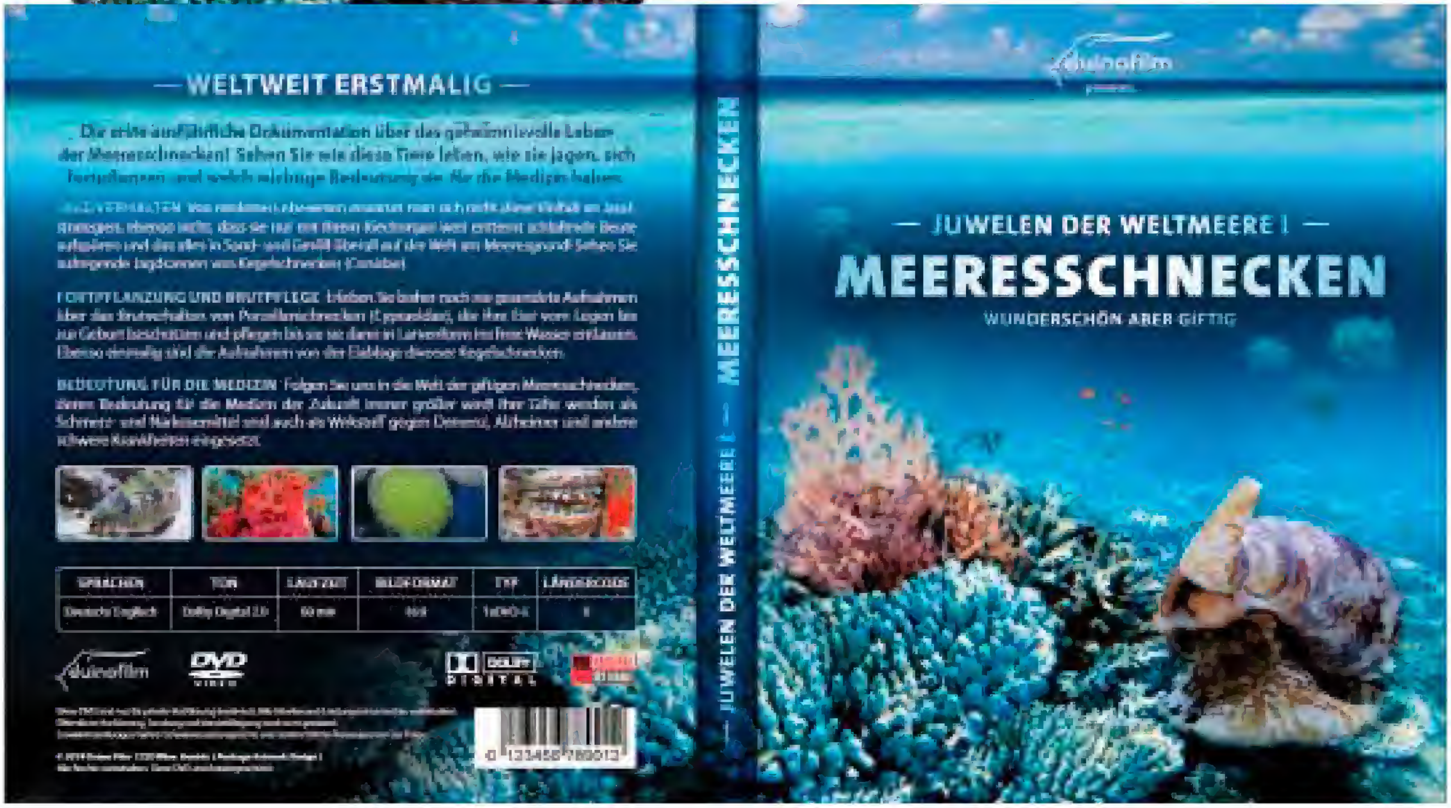

Lt. Col. Robert John Griffiths (9 Feb 1915 – 31 Oct 1986): the forgotten pioneer

Don Cram

In May 1962 Lt. Colonel Robert John Griffiths published a seminal review of the cypraeid genus *Notocypraea* in *Memoirs of the National Museum Melbourne*, which was to be the foundation and inspiration of my 45 year study of these enigmatic southern Australian cowries. In August 2012, I wrote an article in the *Victorian Branch Bulletin* of the *Malacological Society of Australasia* (VBB 265) on his mysterious disappearance after 1968, a summary of his life, his publications, and an appreciation of his ground breaking work that had been largely ignored by academics, shell dealers, and collectors. The article also detailed the search in 1994 to find out what happened to him by Hope Black (née Macpherson), Curator Emeritis, Museum Victoria (formally National Museum of Victoria) and Dr. Jira Zidak of Socorro, New Mexico, USA, who was reviving *The Cowry*, the journal created and edited by Griffiths between 1960 and 1967.

In November 2015, Frances Jolly (née Griffiths), who had been researching her father on line found VBB 265 and contacted me from England; the mystery of his disappearance was solved. Fran also has provided me with personal details of his extraordinary life, which she has kindly allowed me to use in this article.

Born Robert John Griffiths in England, in 1915, he attended Westminster School, a major private school in London and spent his final year of schooling in France, graduating with a French Baccalaureate. He graduated from Kings College, London University, with a degree in mathematics in 1936, and joined the British Army in the same year. During WWII he was involved with the design of a "single action Army weapon" i.e. a machine gun. After D-Day he went to France to work with captured German weapons and tanks, and wrote a very detailed diary about his experiences and observations. During the 50th anniversary celebrations of the end of the war, a part of this diary, together with comments by Fran and her mother, was televised on their local news bulletin.

After the war he spent time working in a number of specialist military establishments and made use of the LEO computer (Lyons Electronic Office I - first computer used for commercial business applications) to calculate trajectories of shells and also worked within the Applied Ballistics Dept of the army. He then went on to work with guided weapons and was in Australia for the firing of the "Black Knight" at Woomera [an early two and later three stage British rocket], in 1959 (among other duties).

Lt. Colonel Robert John Griffiths in Australia.

While posted to various locations after the war he became interested in cowries and published a small paper on Cypraeidae of Akaba, Jordan, in *The Journal of Conchology* (the organ of the Conchological Society of Great Britain and Ireland), of which he became a life member. From September 1953 to April 1954, while posted to British Malaya [Malaysia], he collected extensively on the Island of Penang, the neighboring mainland, and the small island of Pulau Bidan, and he published "*Cypraea* of north-west Malaya," in the same journal in 1956. By 1961 he had published another three articles in that Journal and two more in *Proceedings of the Malacological Society of London.*

Prior to his posting to Australia in 1958 (seconded to the Australian Army), he spent a large part of his embarkation leave putting in order the large cowry collection in the British Museum of Natural History (now NHMUK), which due to Great Britain being the leading maritime nation in the nineteenth century, has what many believe is the finest historical collection of shells in the world.

With his wife Audrey and daughter Frances, he arrived in Australia on the "Himalaya" in December 1957. On arrival in Melbourne he contacted Hope Macpherson, then curator of mollusks at Museum Victoria and began an intensive study of the genus *Notocypraea.* As part of the introduction he wrote, "The present review began with a conchological study. The limitations of this method soon became apparent and the approach was widened to include study of the radula." His interest in the living cowry animal was reflected in his earlier publications.

He collected at Flinders, Victoria, where on 3 February 1958, he found a specimen with a plain flesh coloured dorsum and described it as a new species - *Cypraea* (*Notocypraea*) *wilkinsi* sp.n., of which he illustrated, mounted, and figured the radula. The holotype radula and paratypes 4, 5, 6, and 7 are housed in Museum Victoria. Paratypes 2 & 3 are in the British Museum (which I have seen), paratype 1, a juvenile shell, appears to have been lost. He also collected at Port MacDonnell, visited and studied the collections of the Australian Museum (AM) (where he mounted the radulae of the holotypes of *N. emblema* and *N. dissecta*), the South Australian Museum (SAM) where he examined the type series of *N. euclia*, all now lost, but his radular mount of one specimen remains (Cram 2010), and the Western Australian Museum (WAM) leaving shells and radular mounts. He gained access to many live-taken deepwater specimens of uncertain taxonomic status, now no longer available due to dredging restrictions, leaving mounted radulae and shells in museum collections for future study.

After the family returned to England in January 1960, he retired from the army and moved to Cornwall, where the idea of a cowry journal was conceived. In December 1960 and April 1961, issues 1 and 2 of *The Cowry* were published and he would have been working on his review of *Notocypraea.* In September 1961, they bought Sea Acres, a nature park at Port Macquarie, New South Wales, and returned to Australia on the *Oriana.*

In February 1962, issue 3 of *The Cowry* was published followed by his review of the cypraeid genus *Notocypraea* on 1 May 1962. By August 1965, 8 issues of *The Cowry* had been published and the last appeared as an occasional magazine and, although not dated, was probably in 1968.

Sea Acres also housed his shell collection that was on display in glass cabinets and was sold in 1968 to Robert Harmer and his wife, who gave it to the National Wildlife Service in 1987. They did not want the shell collection and it was sold at auction later that year. Lance Moore purchased much of it for Lord McAlpine in Broome, who placed it in unsuitable storage, where it was ruined and its identity lost. Griffiths kept none of his shells; Fran has one only, a "snakes head cowry."

After Sea Acres was sold in August 1968, the family moved to Kalimna in Beechmont, Queensland, a five acre property laid with rhubarb and avocado trees, which they took to markets in Brisbane. Fran left home in 1974 for a holiday, fell in love with Europe and made it her home. Her parents moved to Nerang, in 1976, and as she describes it, "After they moved to Nerang in 1976, my father felt he preferred the cooler weather in the mountains and moved to Stanthorpe, Queensland. My parents were very close even though they lived apart. From Stanthorpe he moved to Toowoomba, and finally to Eagle Heights, to be near my mother. In 1986 my father developed bowel cancer and had an operation in October of that year, which was successful, but unfortunately this brought on a heart attack and he died on October 31st 1986. My mother stayed on in Nerang until 1993, when she decided to come back to England and live with myself and my husband. She died on the 23rd of February 2012."

Display case at Sea Acres, a nature park at Port Macquarie, New South Wales, Australia, purchased by Griffiths in 1961 and subsequently sold in 1968, along with the shell displays – now lost.

Why a pioneer ?

During his time at the British Museum in 1957, while sorting out the large cowry collection, he found Beddome's original specimens of *N. subcarnea* and *N. albata*, which had been purchased from shell dealers Fulton and Sowerby. He also discovered Gray's original specimen of *N. comptonii* and a specimen of *N. bicolor*, originally from the collection of Gaskoin. These were then incorporated in the type collection, two large trays that I was able to examine in 1980. There would be many other cowry types that he separated out. Fran still has the letter from the director of the museum thanking him for the valuable help given to the Zoology department by putting in order the large collection of cowry shells and devoting so much of his embarkation leave to the task.

The cowry magazine was a testament to his absorbing interest and enthusiasm in all Cypraeidae. Although the magazine carried articles by many prominent cowry specialists, such as F.A. Schilder, Cernohorsky, Donohue, William Old, and Dr. D.A Brand, Griffiths wrote a large proportion of the articles himself. He did not agree with the large number of genera, species, subspecies, and varieties being created on evidence that could not be substantiated. This view was vigorously debated when Schilder and Summers in 1963 described *Notocypraea casta*, the pure white form of *N. comptonii* from Port MacDonnell, as a new species in *The Cowry* 1(5): 65-66. This form and the intermediate had been incorrectly known as *albata* and *subcarnea* respectively. Griffiths (1962a) described in detail the type specimens, "The differences between the type specimens of *albata* and *subcarnea* is small and may prove to be one species and final opinion must be left until similar specimens are found with animals inside. One thing is for certain. Of the cowries labeled *albata* and *subcarnea* now being found in Victoria and South Australia, none I have seen belong to either of Beddome's varieties." This article was the trigger for introduction of the name *casta.*

Notocypraea taxonomy in Australia from the early 60's was influenced by the writings of Iredale and Cotton, neither had any interest in the living animal, (Hope Black, pers. comm.), and these views were reflected in Joyce Allan's 1956 *Cowries Shells of World Seas.* Griffiths in his review of this publication in 1957 stated, "Some interesting information is given about the breeding habits of *Cypraea*: considering however, the facilities available in Australia for study of the living animal, it is most disappointing that more is not made of this subject."

Although live specimens were difficult to find in most areas throughout their range, they were at the time abundant intertidally at Port MacDonnell, where variation in shell patterning was far in excess of typical specimens found elsewhere. This variation of shell patterns produced a collecting frenzy where specimens were sold or traded with names that were derived either by guesswork, opinion, or the views published by Iredale, Cotton, and Allan.

In his 1962 review, Griffiths published a detailed analysis of the shell morphology, habitat, and range of all known taxa, including examination of types, and made radular mounts simply unstained in Euparal. Other than drawings of the radulae of *N. declivis* and *N. pulicaria* by Albert Vayssière (1923), it was the first time any cowry specialist looked beyond shell morphology of *Notocypraea* in any detail with his rudimentary line drawings of the central teeth of the radulae of all five generally recognized valid species and five others whose taxonomic status was debatable. The review included for the first time animal descriptions of common species of *N. angustata, N. comptonii, N. piperita*, and his own species *N. wilkinsi.* It was clearly shown and backed up by radular mounts that the three most common and best known forms *N. angustata*, *N. comptonii*, and *N. piperita* were separate species, easily determined by central tooth structure.

The most significant discovery, was the major difference of the central tooth structure between the two most common species, *N. piperita* and *N. comptonii.* Although typical specimens can easily be separated conchologically, proper identification can be very difficult when the dorsum markings are unusual, indistinct, or absent (plain coloured or albino), and this difference could be easily seen by conventional light microscopy. This method clearly separated Griffiths 1959 *N. wilkinsi* as a form of *N. piperita,* and Schilder and Summers 1962 *N. casta* as an albino form of *N. comptonii.* What Griffiths did for the first time, using a sound taxonomic basis, gave a relatively simple method of diagnosing specimens that were atypical and puzzling as the radular form remained constant between typical and atypical shells, with preserved evidence that was unarguable. "This method of species determination, started in a small way by Griffiths, is importantly and uniquely applicable to *Notocypraea*, as radulae within other genera of Cypraeidae retain a similar form and in themselves are not useful in distinguishing to species level" (Cram 2011).

Robert John Griffiths at Kalimna in Beechmont, Queensland, a five acre property he purchased after selling Sea Acres in 1968.

About 16 radular mounts embracing all his studies are preserved and have been available to researchers since 1959. In 1973, I repeated and confirmed his studies, republishing radular drawings of *N. angustata, N. comptonii, N. piperita* and *N. declivis*. Between 1973 and 1980, I made about 50 slides mounted in the same way and matched to shells, plus seven slides with shells donated to NHMUK. SEM images were done by Dr. Brian Smith of four species and one variety from shells I donated, and are located in the collections of Museum Victoria. This material and that of Griffiths available to researchers at the time, is preserved and is now of historical significance.

One would think that all this evidence would have changed the way study of a genus that paradoxically was in some areas relatively simple and in others extremely complex was viewed, but it had little to no effect...bordering on distain. Academics dazzled by the new SEM technology dismissed the research as outdated, although published differences could be easily seen by simple light microscopy and many collectors questioned the credibility of the author.

Dr.Burgess in *The Living Cowries* (1970) and *Cowries of the World* (1985: 36), in a two page ("Discussion on Southern Australian Cowries") calls the *Notocypraea*, "... without doubt conchologically the most confusing cowrie group." He then rejects the diagnostic use of the radula, stating that "Dr. Alison Kay who is experienced in microscopic dissection found only minor differences in the radulae of these cowries (personal communication)." Sadly, a series of radular mounts of typical and atypical specimens left by Griffiths and those of mine would have easily proved this research flawed. As the participants in this study were not able to collect in the field they had to rely on typical and atypical specimens, diagnosed by and sent by collectors.

Felix Lorenz (1993 & 2000) in his cowry books relied on shell morphology and did not reference Griffiths's work. There is little doubt that Bradner and Kay (1996) in *An Atlas of Cowry Radulae* used an atypical *N. comptonii* specimen to illustrate a *N. piperita* radula (Cram 2011). All of these authors incorrectly listed *N. wilkinsi* as a form of *N. comptonii*, which according to its radula, is a form of *N. piperita* that I had seen and noted in my 1973 article.

Confirmed specimens of *N. wilkinsi* had not been found at or around the type locality until March 1996, when, while dredging with Jack Austin, I obtained my first live specimen from 10-12 meters clearly identified by animal and radula. The second specimen collected at nearby Bear Gully by Simon Wilson was featured with its radula (Cram 2009). Since then about another five have been found by divers all identified in the same way. As there appear to be no intermediates it should now be regarded as an occasional mutant related to *N. piperita*.

It is now clear why Griffiths did not query these publications as he had retired from the scene and never kept any shells other than the one "snake's head cowry," which Fran still has. All his previous acquaintances lost contact, including the Conchological Society of Great Britain and Ireland. No one seemed able to find him.

There is no doubt that Griffiths (John or Griff to his friends) was a highly intelligent well educated man, with an inquiring mind and a brilliant mathematician. His statistical analysis table in his 1962 review of specimens of ten described species, the remnants of some that are still available, but many lost, is now of incalculable value. He was not a man who relied on opinion but was determined to get to the facts, having personally collected and observed in the field many of the specimens used in his studies. In Fran's own words, "He was a man to whom numbers meant everything, whether within the army sphere or little things such as probability problems or counting the number of wild strawberries he had just picked and writing to tell me about it! He could spend an evening throwing dice, recording the answer, and doing it again and again to test the bias of the dice. I still have his dice. My father was extremely meticulous in everything he did, but he also had the ability to cut himself completely away from something if it had upset or annoyed him." Maybe there is a clue in this last sentence as to why in 1968 he disposed of all his shells and went into quiet reflective retirement.

His last publication was an obituary to Dr. Franz Alfred Schilder who wrote many articles for *The Cowry.* He described him as a man with a magnificent eye for detail and a foremost author on Cypraeacea and in particular Cypraeidae for over 50 years, but due to the location of his home was unable to undertake field work and it was said that he only twice saw living cowries, which was a serious limitation. Although Schilder disagreed with many of the proposed genera and splitting of species, he wrote that Griffiths' system must be recognized as a starting point in the study of Cypraeidae.

Maybe this summary of Griffiths' life will serve as an example for budding researchers to not ignore basic research that disagrees with current published data, but to repeat and check as I did in early 1970. In the conclusion to the introduction of his 1962 review Griffiths wrote, "It only remains to emphasize that this paper is no more than a preliminary review of an extremely complex group. Study of new material which modern methods of collecting are now providing will inevitably change the picture in many respects. This further research will only be possible if every collector adopts a new point of view. He will have to realize that information on the animal – its habitat, appearance, structure, radula, and method of breeding – is even more important than collection of the shell. Until further knowledge of the animal is gained, little progress is likely."

How true has all this proved to be? The basic rules of scientific enquiry do not discriminate, but apply equally to amateur, student, and professional researchers. His publications, preserved shells and radular mounts of specimens, particularly from deep water in the Bass Strait and the south eastern coast, which other researchers have not seen or bothered to seek out, have been a foundation to my study of the genus for 45 years, resulting in many papers and finally now, a combined DNA project with a leading geneticist now in progress. John Griffiths is perhaps no longer a forgotten pioneer.

Acknowledgements:

I would like to thank Fran Jolly née Griffiths for contacting me and supplying personal details on her father, of whom she was very fond and allowing me to use these in this article.

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Don Cram
donald.cram@bigpond.com

Clavatula diadema **(Kiener, 1839) 30mm, dredged by shrimp trawler at 50 meters, Gabon, W. Africa.**

Still more on turrids...

Bruce Neville

In my recent article on turrids (*American Conchologist* 44 (2): 4), I neglected to make reference to two important articles that laid the foundation for the current understanding of turrid and conoidean phylogeny. The article by Puillandre et al. lays out the familial arrangement in the penultimate paragraph of my article, while the article by Bouchet et al. arranges all the then-known genera by family. As expected, there have been changes to the familial placement of some genera. These changes can be tracked in the WoRMS database online. My sincerest apologies to the authors of these two landmark papers.

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2016 Shell Shows & Related Events (June – December)

- Following information is subject to change. Please verify with individual organization -

Jun. 12-16, 2016
Joint AMERICAN MALACOLOGICAL SOCIETY / WESTERN SOC. OF MALACOLOGISTS MEETING
Ensenada, Mexico
School of Marine Sciences, Univ. Autonoma de Baja California, Ensenada
Dr. Angel Valdes, Cal Poly University, Bldg. 4 Rm. 2, Pomona, CA 91768, USA
e-mail: aavaldes@cpp.edu Tel. (909) 869-3005

Jun. 18-19, 2016
GULF COAST SHELL SHOW, Panama City Beach, FL
Panama City Beach Senior Center, 423 Lyndell Lane
Jim Brunner, 2511 Parkwood Drive, Panama City, FL 32405
Email: jili@knology.net Tel. (850) 215-2086

Jul. 1-3, 2016
TOWNSVILLE SHELL SHOW, Townsville, Queensland, Australia
Orchid Society Hall in Kirwan
Jack Worsfold
Email: jnw_48@yahoo.com.au

Jul. 9-10, 2016
KEPPEL BAY SHELL SHOW, Yeppoon, Queensland, Australia
Gus Moore Pavilion at the Yeppoon Show Ground
Jean M. Offord, 277 McDougall St., N. Rockhampton, Qld. 4701, Australia Tel. 61 (7) 4928-3509

Jul. 27-31, 2016
CONCHOLOGISTS OF AMERICA ANNUAL CONVENTION, Chicago, IL
Crowne Plaza Chicago O'Hare Hotel, 5440 River Road, Rosemont, IL 60018
Katarina Frost
E-mail: 2016COA@gmail.com Tel. 847-458-7000
Website: www.conchologistsofamerica.org

Aug. 19-21, 2016
JERSEY CAPE SHELL SHOW, Stone Harbor, New Jersey
The Wetlands Institute, Stone Harbor, New Jersey
Sue Hobbs e-mail: suehobbs@verizon.net (609) 884-7601

Aug. 13, 2016
CHATSWORTH SHELL FAYRE, Derbyshire, UK
Cavendish Hall, Chatsworth Estate, Derbyshire
Brian Hammond, Sulwath, Dornockbrow
Dornock, Annan DG12 6SX, UK
E-mail: brianandedna@btinternet.com 44 146 170 1096

Aug. 26-Sept. 5, 2016
OREGON SHELL SHOW, Salem, OR
Or. St. Fair Gnds – Jackman-Long Bldg., 2330 17TH St. NE
John Mellott, 1310 Crowley Avenue SE, Salem, OR 97302
E-mail: retheresa@comcast.net Tel. (503) 363-5017

Sept. 17 & 18, 2016
NORTH CAROLINA SHELL SHOW, Wilmington, NC
Cape Fear Museum of History & Science
814 Market Street, Wilmington, NC 28401
John Timmerman, Show Chairman (910) 798-4368
E-mail: jtimmerman@nhcgov.com

Sept. 24-25, 2016
ANNUAL GERMAN SHELL FAIR, Oehringen, Germany
KULTURA Hall, Herrenwiesenstr. 12
Kurt Kreipl, Hoehenweg
D-74613 Oehringen-Cappel, Germany 61 (7941) 62-826
E-mail: meeresmuseum@t-online.de

Oct. 22, 2016
BRITISH SHELL COLLECTOR'S CLUB CONVENTION, Essex, England
Theydon Boys Community Centre, Theydon Boys, Epping, Essex
Debbie Rolfe, 15 Dene Holm Road, Northfleet, Kent DA11 8LF, U.K.
Email: Deborah@deborahrolfe.orangehome.co.uk

Oct. 22, 2016
SYDNEY SHELL SHOW, Sydney, Australia
Ryde Eastwood Leagues Club, 117 Ryedale Rd.
West Ryde, Sydney,.
Steve Dean, 166 Narabeen Pk Pde
Mona Vale, NSW 2103 Tel. 61 (2) 9979-5736
E-mail: steve@easy.com.au Cell: 61 (4) 1175 1185

Oct. 22-23, 2016
PHILADELPHIA SHELL SHOW, Philadelphia, PA
Academy of Natural Sciences, Parkway & 19th St.
Al Schilling, 419 Linden Ave., Glenside, PA 19038
E-mail: odtaa31@comcast.net Tel. (215) 886-5807

Oct. 15-16, 2016
XXI PRAGUE INTERNATIONAL SHELL SHOW, Prague, Czech Rep.
KULTURNIDUM LADVI Buresova 1661, Prague 8
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Poser Shell Auction in Boston

Edward Nieburger

On the remarkably pleasant and snow-free Sunday afternoon of 28 February 2016, Boston area conchologists attended the "event of the decade." Members of the Boston Malacological Club were invited to participate in the auction of the late Dr. Charles M. Poser's seashell collection. The auction took place in Dr. Poser's home, an old "brownstone" in South Boston, in the shadow of Boston's Prudential Tower, a prestigious neighborhood, new to all who attended. Designed when horses and carriages existed, parking was at a premium along Rutland Square, South Boston.

Dr. Charles M. Poser (1923 - 2010) was an internationally renowned neurologist, specializing in multiple sclerosis (MS). In 1983, Dr. Poser published in the *Annals of Neurology* "a definitive system, refined from the criteria for measuring and describing MS." Known as the "Poser Criteria," it was quickly adopted worldwide as the standard tool for diagnosis of MS. He also authored several influential books and hundreds of scientific articles.

Dr. Poser was born in Antwerp, Belgium. His father, a naturalized American citizen, procured passage for his family, all Jewish, to sail from Antwerp to New York, on 12 May 1940. On 10 May, two days before they were to leave, Germany invaded Belgium and bombed Antwerp harbor. The family moved to the Belgian coast near Dunkirk, France, where Charles, then 16 with his Boy Scout First Aid merit badge, volunteered at the makeshift British military hospital on the Channel coast during the epic Anglo-French evacuation of forces to England -- May and June of 1940. Subsequently, the family was smuggled across occupied northern France to Paris, then to Bordeaux, where they were provided with Portuguese visas. They sailed from Lisbon to New York, in September of 1940.

Charles Poser graduated from George Washington High School in New York City in 1941. In 1943, he quit the City College of New York, and enlisted in the U.S. Army, whereupon he returned to Europe as part of a military intelligence unit. He was at Bastogne and the famed Battle of the Bulge in the winter of 1944. Later he was attached to the 3rd Army of George Patton and was present at the liberation of the Nazi concentration camp at Mauthausen, Austria, in May 1945.

Charles returned to New York City and the City College of New York after the war. In 1947, he graduated Phi Beta Kappa. He took his medical degree from Columbia College of Physicians and Surgeons of Columbia University in 1951. He won a Fulbright Scholarship in 1955, which allowed him to return to Belgium to study degenerative neurological diseases.

Dr. Charles M. Poser (1923 - 2010) upon his induction into the Royal Society of Medicine in Edinburgh.

While studying in New York City, Charles's sister, Eliane, introduced Charles to Joan Crawford. Joan graduated from Hunter College at age 20 and was similarly awarded Phi Beta Kappa. During their 60 years of marriage and during over 50 years of Charles's career, Joan edited his medical papers. He always maintained that she was his best editor.

Charles and Joan were legendary hosts for parties, with her skill in French and Chinese cuisine especially noted. In 1981, the couple moved to Boston. Among Charles's eclectic diversions, in addition to his massive collection of carefully catalogued seashells from around the world, was an extraordinary collection of international military medical insignia and badges, now at the National Museum of Health and Medicine at the Walter Reed Army Medical Center in Washington, D. C.

Doctor Poser's son and daughter-in-law kept a few shells as souvenirs, but they wanted the huge bulk of shells, the few shell books, and a dozen or so minerals and fossils, to go to the highest bidders. The members of the Boston Malacological Club were delighted with this opportunity. As can be seen in the pictures, the doctor seemed to have specialized in pecten (particularly lion's paws), *Spondylus*, *Xenophora* carrier shells, limpets, razor clams, and oysters.

Dr. Poser traveled extensively in Japan, and purchased shells from dealers there with the initials AT, HT, and DZK. From his hand-printed, then hand-written, bound catalog, with 1,549 entries of marine shells purchased from circa 1950 through 1991, the following domestic dealers were coded by their initials in the catalog: Simon de Marco, Ft. Myers, Florida (SDM); Museum of Natural History (MNH); MacArthur's Shell Shop, New York City (McA); George Jeffreys, Brooklyn, New York (GEJ); Ormond McGill, California (McG); John Q. Burch, California (JQB); A. Gordon Melvin, Massachusetts (AGM); and unknown foreign dealers including CSI, who supplied Australian shells exclusively and RK, who supplied European shells exclusively. Additional unknown dealers had initials FSH (West Coast or Hawaii), FKH, NSS, FHK, FKH, VFS, CM (perhaps in Southern California), CFK, FSF, and EM (which could have been Elliot Michaelson of Newton Center, Massachusetts). As Dr. Poser traveled to all continents except Antarctica, thus some of these initials could be from dealers on any of those continents.

The auction, both oral and silent, was successful. Every shell was sold, although it took five hours to do so. The family furnished sandwiches, vegetable and cheese snacks, water, beer, and wine to make the experience very special. The son and daughter-in-law seemed quite satisfied with the result, and even offered their credit card app. on their phone so some could charge their purchases. Boxes and bubble wrap were also furnished. It was truly a surprise to us all, who had never known that such a serious shell collector was so near, but with whom we never made contact.

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One of Dr. Poser's shell cabinets with a variety of shells.

Another of the shell cabinets with lots of scallops, jackknife clams, and strombs.

And still another of the cabinets. This one has more scallops & strombs, plus abalones, murex, limpets, etc.

Some lion's paws, cones, and other shells in a cabinet.

Miscellaneous shells not in cabinets.

Some of Dr. Poser's colorful scallops on display.

More miscellaneous shells.

Scallops not in a display case.

Some rather nice fossil specimens.

Mid-Atlantic Malacologists Meeting – 2016

Elizabeth K. Shea and Timothy A. Pearce

The 2016 Mid-Atlantic Malacololgists

Back row from left: Zahra Mansur, Kevin E. Scriber II, Ken Hayes, Gary Rosenberg, Bart Tomascak, Colleen Winters, Matt Blaine, Vinnie Peters, Charlie Sturm, Bob Schmidt, Phil Fallon.

Middle Row: Dona Blaine, Lauren Sweeney, Kathy Schmidt, Nate Shoobs, Liz Shea, John Wolff, Francisco Borrero, Janice Voltzow.

Front Row: Beysun Örstan, Aydin Örstan, Rich Goldberg, Kacie Goldberg, Tim Pearce, Alex Kittle, Megan Paustian, Makiri Sei, Heather Brock, and Erika Iyengar.

Missing: Heather Kostick, Jeff Long, Larry and Takako Van Stone.

The 18th Mid-Atlantic Malacologists (MAM) meeting was held on 2 April 2016, at the Delaware Museum of Natural History, hosted by Elizabeth Shea and Alex Kittle. There were 33 people in attendance and 16 talks were given to a receptive and engaged audience. Thanks to all the participants for another fun and informative day!

Next year, MAM will be co-hosted by Ken Hayes (Howard University) and Ellen Strong (National Museum of Natural History) in Washington D.C. Stay tuned for more details as MAM goes on walkabout to our Nation's Capital!

Talks presented, arranged alphabetically:

F. Matthew Blaine, Curatorial Associate, DMNH. **Range extension of the invasive landsnail *Bulimulus sporadicus*.** A brief review of how a group of unusual snails found at Port Malabar, FL, were collected and identified.

Richard Goldberg, Worldwide Specimen Shells. **Observations of terrestrial mollusks at night in Jamaica.** Nighttime observations of annulariid and pleurodontid snails in Cockpit Country showed the unusual behavior of mucus dangling.

Erika Iyengar, Muhlenberg College. **Possible impacts of an invasive slug (*Arion rufus*) on San Juan Island, Washington.** Investigations of possible competition between an invasive slug and the native banana slug by assessing feeding preferences and the lack of impact of alterations by the invasive slug in nutrient cycling on grass growth.

Jeffrey Long, Partnership for the Delaware Estuary. **Freshwater Mussel Recovery Program and Volunteer Mussel Surveys.** An introduction to the citizen-science mussel survey and recovery programs run by the Partnership for the Delaware Estuary. Efforts to propagate and re-introduce mussels and monitor success have been ongoing since 2011.

Zahra Mansur, undergraduate student, Howard University. **Microsatellite analysis of apple snail egg clutches from Lake Sanu, Uruguay.** This paper described the genetic analysis of apple snail eggs to determine the frequency of multiple paternity.

Aydin Örstan, Research Associate, Carnegie Museum of Natural History. **Sizes and shapes: a database for pulmonate land snails.** Shell dimension for most shelled land snail genera analyzed to determine size and shape distributions and to recognize patterns.

Timothy A. Pearce & Chelsea Arnold, Carnegie Museum of Natural History. **Decline of *Anguispira alternata* in Pennsylvania, USA**. Fewer records of *Anguispira alternata* in recent decades suggest this formerly abundant land snail has declined. We demonstrated that the decline is real as opposed to insufficient search. The decline appears to have started about 1960. Of four hypotheses considered for the decline, the timing of rise in acid precipitation best matches the timing of the snail decline.

Winfried "Vinnie" S. Peters, Indiana/Purdue University Fort Wayne. **Olivid gastropods from the Central American West Coast.** This highly entertaining and informative movie clip of olivid gastropods hunting and consuming prey was originally produced for an exhibit at the Museu do Mar Rei Dom Carlos in Cascais, Portugal.

Kathy Schmidt, Simon's Rock College**. Shell Collecting in Vulcan's Shadow.** This talk highlighted ongoing collecting and research efforts on Montserrat, BWI, as part of the Field Biology summer program at Simon's Rock College.

Kevin E. Scriber, II, Howard University. **The trophic ecology of *Pomacea* spp. in the La Plata Basin of Uruguay.** This talk introduced the negative impacts of invasive apple snails, presented results on trophic position within the native range, and highlighted future work in Florida, China, and Hawaii.

Elizabeth K. Shea, Delaware Museum of Natural History. **AMS 2017**. This talk introduced the University of Delaware as the venue for the next AMS meeting in July 2017. Lodging options and possible symposium topics were discussed, a local organizing committee was solicited, and local volunteers were recruited to help develop social events.

Nate Shoobs, Undergraduate student, Simon's Rock College and Research Associate, DMNH. **Preliminary notes on the Lesser Antillean genera *Amphibulima* Lamarck, 1805 and *Pellicula* Fischer, 1856.** Presentation on the taxonomy, anatomy, distributions, and ecology of two rare and poorly known genera of terrestrial neotropical semi slugs.

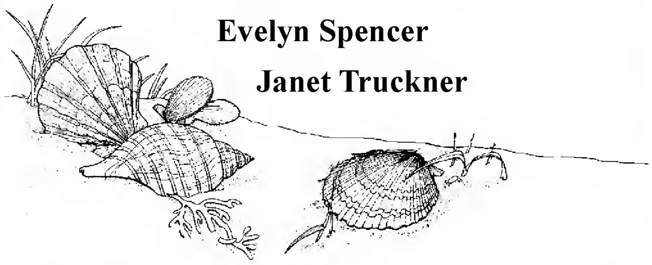
Makiri Sei and Gary Rosenberg, Academy of Natural Sciences of Drexel University. **The Cockpit Country of Jamaica: a limestone forest of global importance.** This talk provided a description of the geology of the area and the landsnails that occur within.

Bart Tomascak. Discussion of subjective variance of mollusks. Description of yearly collecting activities on New England beaches and observations on difficulties inherent in learning how to identifying shells that may be worn, damaged, or otherwise imperfect exemplars.

Janice Voltzow, University of Scranton. **Why do shells have holes? So we can see inside!** Using an endoscope to look inside the mantle cavities of keyhole limpets and abalone shows that in contrast to how gills are traditionally illustrated, in the living animal the gills are large, inflated and fill the entire mantle cavity.

Colleen Winters, Towson University. **Return of the Snail: The tale of *Patera sargentiana*.** The story of *Patera sargentiana* land snails that were raised in captivity, multiplied like crazy, and were released back into the location where they were originally collected.

In Memoriam:
Cliff Harris
Patricia Humphrey
Anna Marie Nyquist
Evelyn Spencer
Janet Truckner



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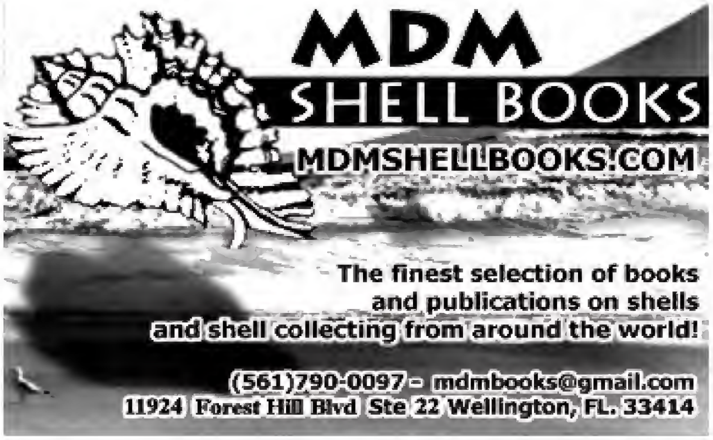

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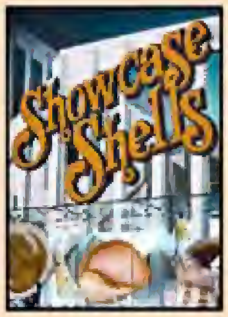

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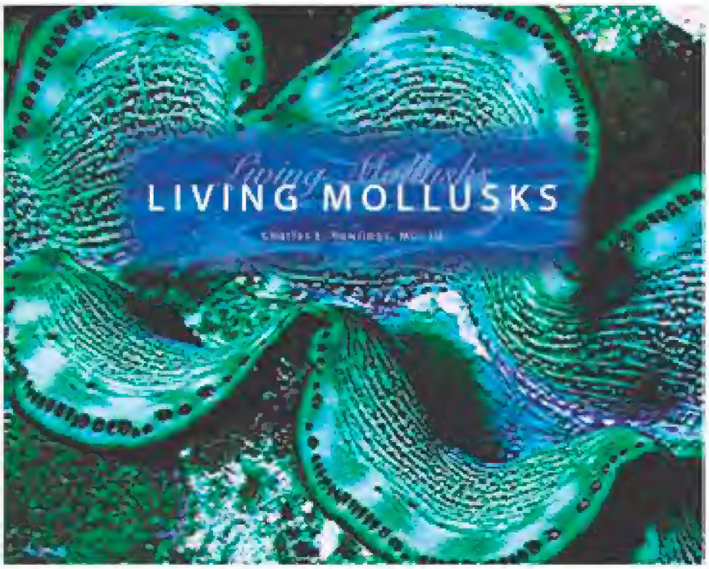

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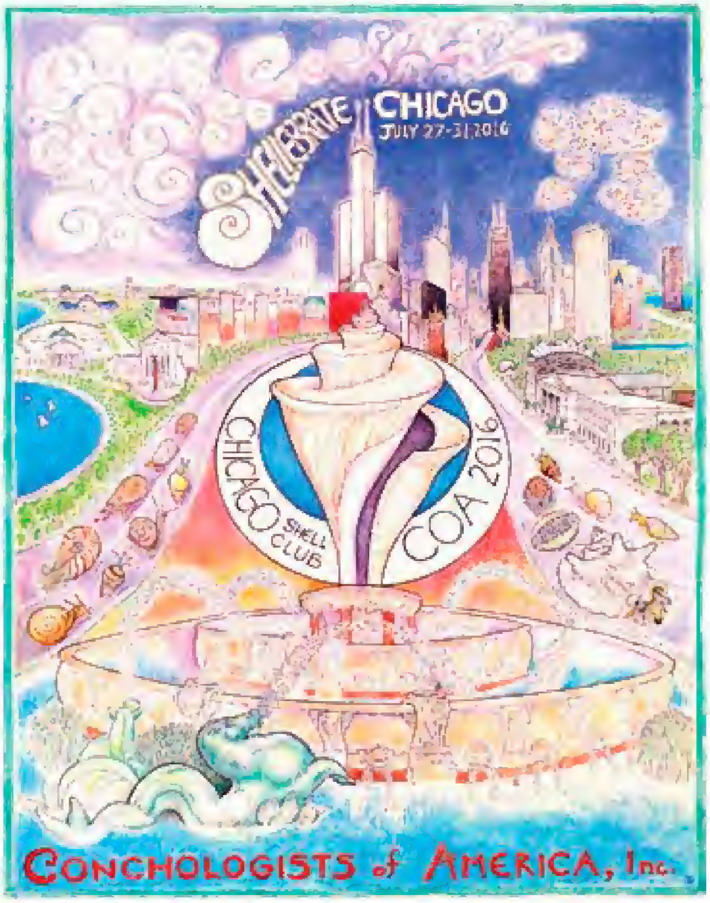

Studies of satiation in *Melibe leonina*

Colin A. Lee (photos by author except as noted)

As I swam through the kelp bed in Friday Harbor, I scanned each blade of algae fervently, searching for my quarry. With each empty frond I grew less and less hopeful, until at last, in the distance, I saw a blade surrounded by ghostly apparitions. As I drew closer, several of them detached from the kelp and swam off, bending slowly from head to tail. Others remained and continued to feed, sweeping their heads forward with contortive movements to pull microscopic prey from the water. In this moment I was struck by the bizarre yet wonderful nature of this species, the nudibranch *Melibe leonina*.

At first glance, few people recognize *Melibe* as a gastropod. It has a large, soft body, translucent skin, and a bulbous oral hood, traits more reminiscent of a jellyfish. Additionally, *Melibe* filter feeds, a strategy rarely seen in this taxon. Closer examination reveals its true heritage. *Melibe* has the muscular foot and anterior to posterior polarity of a gastropod, and more importantly moves in the deliberate and graceful manner of its relatives. As a result of its unique traits, *Melibe* has become popular among slug lovers, a fact that is readily apparent after a quick Google search of the name. Beneath these overt characteristics, though, *Melibe* is even more fascinating. With a simple brain and behavior, *Melibe* is an attractive model species for studies of neurobiology, and is being used to examine a variety of neurological phenomena. For the past several years I have studied these slugs to try to understand an emerging topic in neurobiology: the neural mechanisms of satiation. More specifically, I am trying to understand the way that the *Melibe* nervous system acts during a meal to reduce the motivation to feed. With luck, this research will further what we know about the way nervous systems control behavior.

The use of gastropods, including *Melibe*, in neuroscience is not new. Gastropod brains are many orders of magnitude smaller than our own (most nudibranchs have fewer than 10,000 neurons, as compared to an estimated 80 billion for humans), and are organized into visibly discrete aggregations of cells called ganglia (Kandel, 1979). The neurons are large and can be individually identified, both based on electrical output and function within a neural circuit (good luck individually identifying human neurons). Gastropods also perform fewer behaviors than do vertebrate models, which reduces the number of variables in a neurological investigation of their behavior. Consequently, it is possible to identify the neural circuits that produce a specific behavior. For more than 40 years scientists have done just that, uncovering the neural bases of discrete actions like swimming, crawling, and biting. Other aspects of behavior, however, have remained unclear. One area of behavior that remains poorly understood is the neural control of behavioral modification, meaning the way that nervous systems change motivational state.

Melibe leonina **North Puget Sound, Anacortes, Washington, NOAA photo, Wikipedia.com.**

As a model topic of behavioral modification, scientists have turned to satiation, or a decrease in the responsiveness to food (Kupfermann, 1974). Why? Feeding motions are easy to count and animals respond consistently to food, which makes feeding experiments easy to run. Much has been learned from traditional model species: the pond snail *Lymnaea stagnalis* (Elliott and Benjamin, 1989) and the euthyneurans *Aplysia calfornica* (Kupfermann, 1974) and *Pleurobranchaea californica* (Croll *et al.*, 1987), but there is still much to learn. These species will undoubtedly continue to yield more knowledge about satiation, but *Melibe leonina* may very well be the ideal species in which to study this topic.

The excellent fit of *Melibe leonina* starts with the part of the nervous system that controls the mouth: the paired buccal ganglia. Most gastropods use the mouth to bite, chew, and swallow: complex motions controlled by many neurons. *Melibe*, as filter feeders, do not bite or chew, and consequently do not need many neurons to control the mouth; each ganglion has only 30-40 neurons, as compared to the buccal ganglia of *Aplysia californica*, which each have an estimated 840 neurons. There are also only four nerves that project from each ganglion, which means that there are

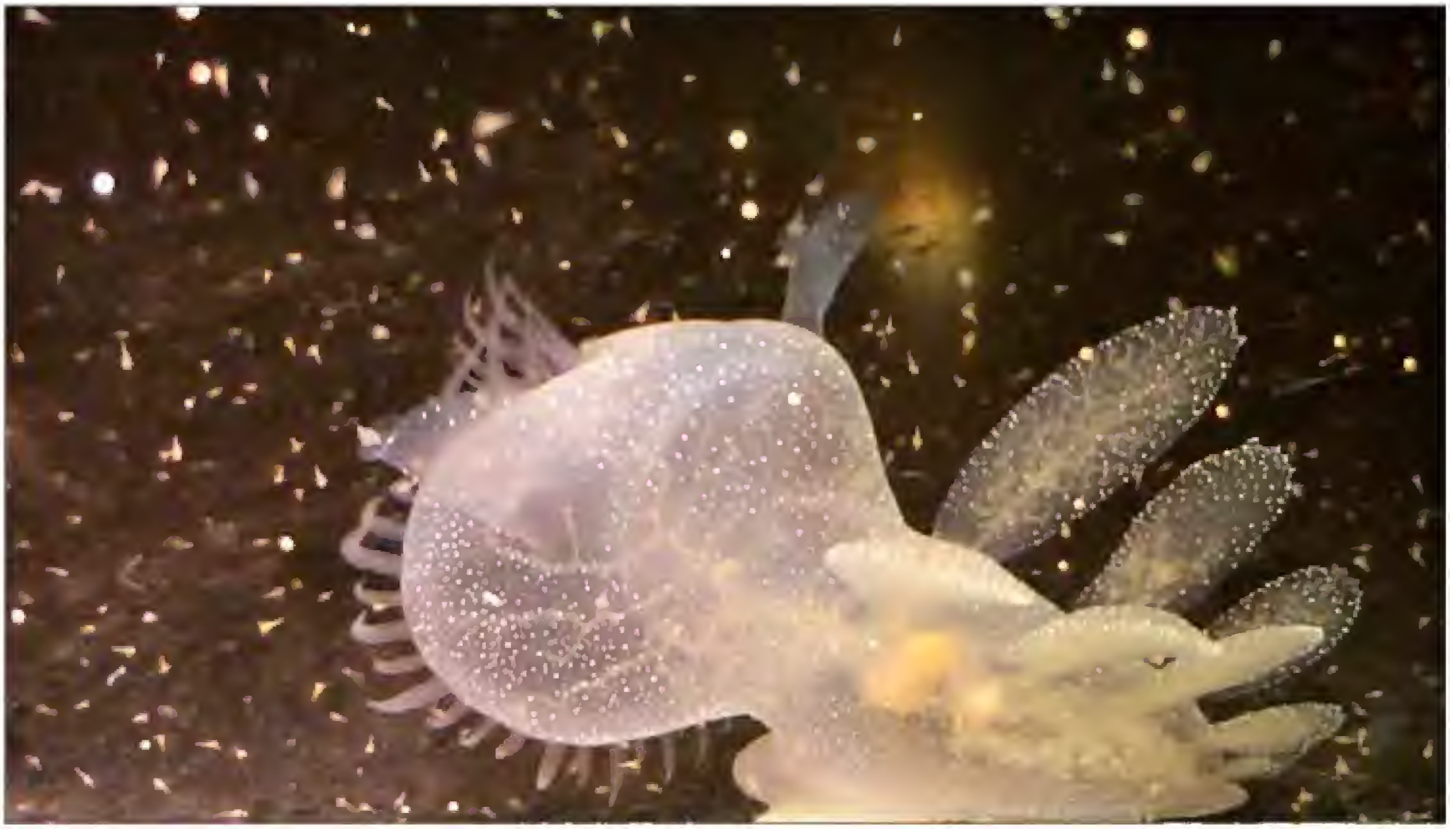

Figure 1: a side view of *Melibe leonina*. This animal was in the middle of opening its oral hood to capture brine shrimp (the numerous small white specks surrounding *Melibe leonina*). The tentacles lining the oral hood are used to create negative pressure that draws water into the hood. Common names for *Melibe leonina* include: "hooded nudibranch," "lion's mane nudibranch," or "lion's mane sea slug."

not many ways in which information about feeding can travel to the rest of the brain. This simplicity extends to the rest of the nervous system, as *Melibe* have far fewer ganglia in total than other species.

The unique morphology and behavior of *Melibe leonina* also contribute to its tractability as a model species. The semi-transparent skin, which creates such a unique appearance, also allows one to see the stomach without cutting the animal open. The feeding motions, wide, sweeping movements of the oral hood that draw in prey organisms, are impossible to miss and easy to quantify (Watson and Trimarchi, 1992).

My investigation of satiation proceeded in three steps. First, I attempted to determine if *Melibe* satiates in the first place. After this, I attempted to identify the stimuli that cause satiation, and, armed with that knowledge, sought to characterize how these stimuli influence the nervous system's activity.

That *Melibe* satiates may seem like a foregone conclusion, however, one study has suggested that *Melibe* will eat almost non-stop as long as food is available (Schivell *et al.*, 1997), which would mean it does not satiate. To determine if this is truly the case, I performed an experiment in which I gave brine shrimp (*Artemia* sp.) to *Melibe* and allowed them to eat *ad libitum*. The animals responded immediately to the food, and ate very rapidly for an hour. After this point, they began to eat more slowly and their feeding rate tapered off over the next five hours. Finally, six hours after they had first begun to feed, the subjects stopped entirely. Although the animals fed for a long time, they did stop, showing that they do indeed satiate. With this result, I could now move on to my other questions.

Research in a number of other species has shown that satiation correlates with an increase in stomach volume, so I attempted to see if this happens in *Melibe* as well. I filled the stomachs of several *Melibe* with gelatin to mimic the distention that occurs after a meal and, after they had recovered, fed them. Many of these animals showed no interest in eating, and those that did ate more slowly and for less time than animals with empty stomachs (these animals had been handled in the same manner as those with filled stomachs, but I didn't put any gelatin into them). This was pretty strong evidence that stomach distention decreases the motivation to feed, but I wanted to get a more fine-scale view of how the two factors interact. To do this, I performed an experiment in which I fed several animals and measured their stomach volume every 30-60 minutes. Initially, they ate very quickly, with stomach volume increasing steadily,

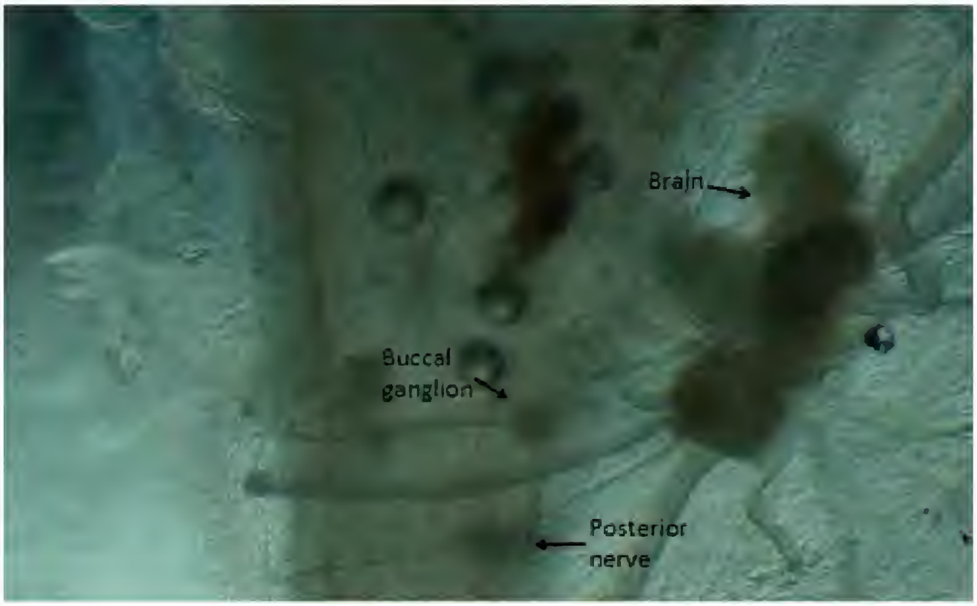

Figure 2: the *Melibe* brain and buccal ganglion. Both structures lie directly on the esophagus (the yellowish shape behind them). The buccal ganglion connects to the brain via a single nerve; another nerve, the posterior nerve, emanates from the ganglion and runs along the esophagus and stomach.

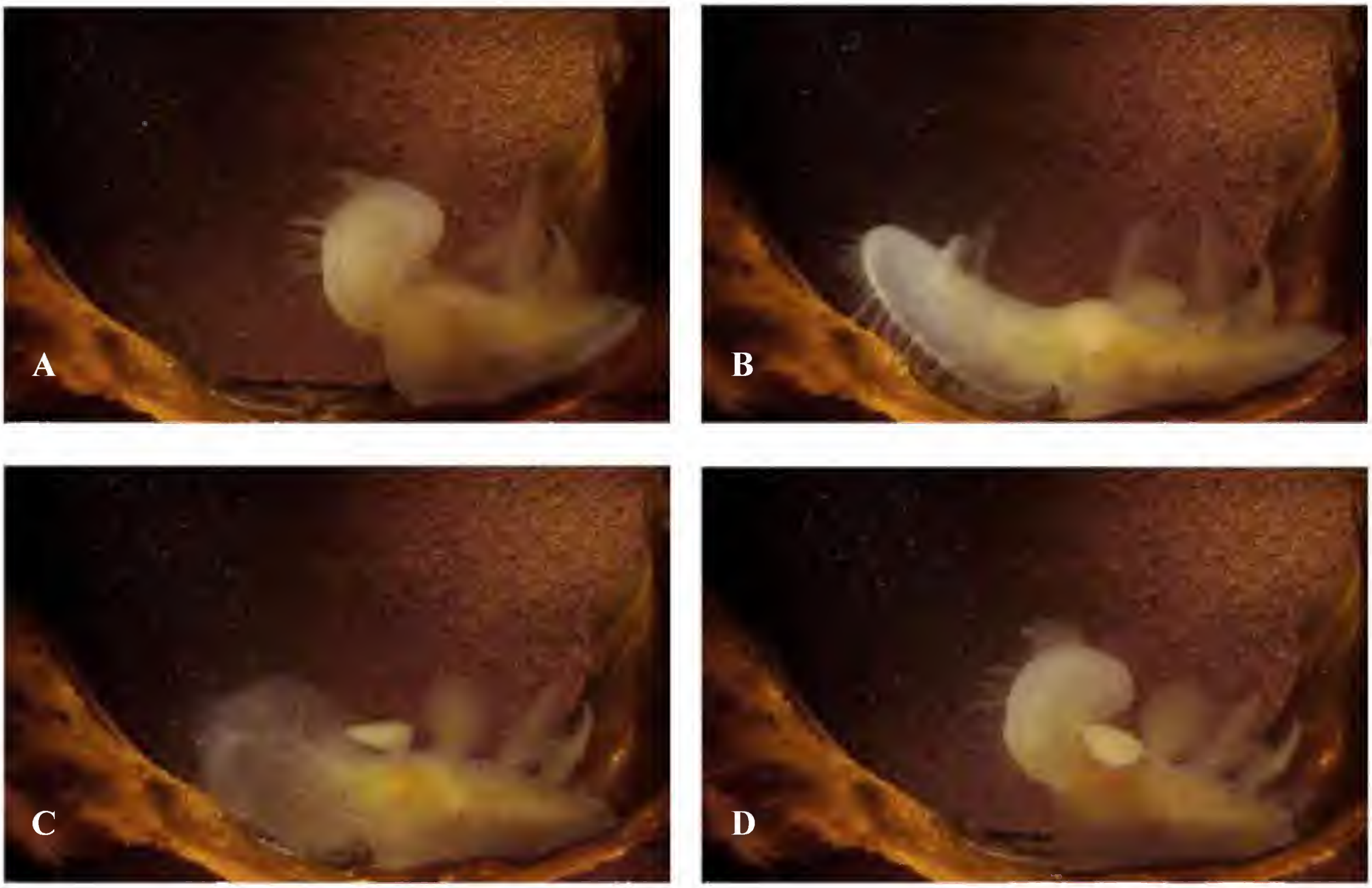

Figure 3: the different phases of a *Melibe* feeding motion. A) The animal begins with its oral hood held closed and upright. B) Casting, oral hood comes forward and creates negative pressure to suck water in. C) Closure, hood comes together and tentacles interdigiate to form a sieve. D) Tilt and squeeze, water is forced out through the sieve and the food swallowed. There is a short video of *Melibe leonina* feeding at: https://www.youtube.com/watch?v=bNXDCkRfA8E

Another view of the enigmatic *Melibe leonina.* This specimen was photographed off Santa Cruz, California, by Robin Agarwal, and is shown on Wikipedia Commons.

but after the stomach had reached about half of its maximum volume, feeding rate slowed down. They continued to feed and the stomach continued to fill for several hours after, but rate of change continually slowed down. These results show pretty clearly that stomach distention inhibits the motivation to feed, and that the degree of inhibition relates to the degree of distention.

My final goal was to determine how this information actually travels to the brain. There is a pair of nerves that run along the stomach and esophagus, the posterior nerves, and these connect to the two buccal ganglia (which, remember, control biting in other species). As such, it seemed likely that the posterior nerves communicate stomach distention. To test this hypothesis, I performed a feeding experiment in which I fed animals whose posterior nerves had been lesioned, comparing their feeding to that of control animals. Both groups ate similarly for the first hour, but while the regular ones slowed down at this point, the lesioned ones kept on eating at a pretty fast rate. Ultimately, the lesioned ones ate longer, and post-meal dissections revealed that they consumed more brine shrimp as well. This result clearly suggested that the posterior nerves convey stomach distention; without the nerves *Melibe* eats longer and consumes more.

To really make the case for the posterior nerves' role in satiation, I needed to dig beyond the behavioral studies, and into the physiology of the nerve itself. To do this, I recorded the electrical activity of the posterior nerve while mimicking the distention that occurs during a meal, creating distention by inflating the stomach with water. The posterior nerve increased its signaling (the number of action potentials it sent) when the stomach was distended and there was a correlation between level of distention and how much the signaling increased. When the stomach was partially distended the firing rate picked up and when the stomach was completely distended the rate increased even more. These data were really exciting to see and unequivocally demonstrated that the posterior nerve responds to stomach distention.

With these experiments complete, I can now answer the questions I originally asked; *Melibe* does satiate, it satiates due to stomach distention, and stomach distention is conveyed by the posterior nerves, which run along the stomach and esophagus. With these questions out of the way, we can now attack the more subtle aspects of satiation in both *Melibe* and animals in general. For example, how does posterior nerve signaling affect what goes on in the buccal ganglion? The journey will do a lot to help uncover the neural basis of behavioral modification, but along the way we will undoubtedly learn more about *Melibe* as a species, and hopefully gain an even deeper appreciation of this majestic slug.

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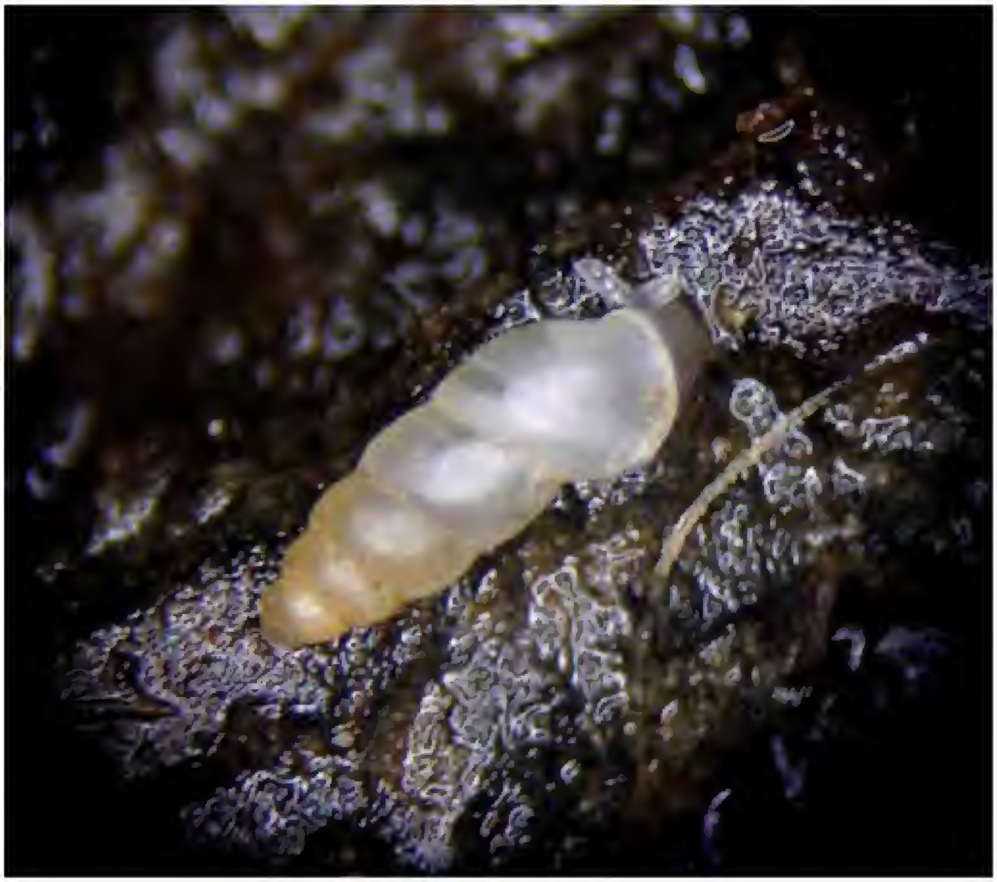
Carychium cognomen conundrum continues to confound conchologists; culture confirms

Lori Schroeder (photos by the author)



An adult *Carychium* crawling on a piece of bark. The *Zonitoides* and *Carychium* cohabited without incident for several months. Also pictured on the Jacksonville website maintained by William Frank at: <http://www.jaxshells.org/175b.htm>.

In the course of prematurely terminating a snail-trapping campaign in the style, and on the heels, of the Kochi Hill, Kentucky, study (Lee and Schroeder 2012), I scrupulously searched traps for living specimens. A single *Zonitoides arboreus* (Say, 1817), the quick gloss, was found and placed in a terrarium along with a small piece of bark as "habitat."

Shortly afterward, while observing the quick gloss under microscopic enhancement, I noted a tiny *Carychium* sp. in a bead of condensed humidity. Thinking the snail had drowned, I placed the specimen on the bark for photography. After a few days the specimen seemed to have disappeared. Less than a week later, tiny juvenile *Carychium* sp. were observed crawling in and around minute crevices in the bark. Wanting an identification for the adult and juveniles, I began a search of easily obtainable literature to clarify the matter. Such elucidation has proven elusive.

One of five extant subfamilies in the family Ellobiidae, the Carychiinae is composed of land snails averaging approximately 1.75 mm in length. Taxonomic placement was within the order Basommatophora (now considered a non-monophylogentic "informal group" by Bouchet & Rocroi (2005)) and reflected, among other characters, in the location of the eyes (on the head posterior to the tentacles). Many of the world's freshwater "pulmonates" are also placed in this group. Land pulmonates with retractable eye stalks are placed in the clade Stylommatophora, and this latter group predominates in my neck of the woods. Their small stature aside, variability of shell morphology makes the species of Carychium quite difficult to diagnose. This situation poses a problem for even the most seasoned land snailer.

While attempting to research *Carychium* systematics, I encountered a lack of consensus as to the valid species occurring in the northeastern North American fauna. An example, in order of publication, of incongruent treatment follows. The list is by no means complete and biased by geographic relevance or accessibility: Pilsbry (1948) includes six species and two sub-species; Burch (1962) lists four species, interestingly omitting *C. exile*; Branson (1973) includes three species, and again, *C. exile* is excluded; Burch and Van Devender (1980) proffer the most compelling evidence for eight species; Hubricht (1985) closely follows Burch and Van Devender (1980); Branson and Batch (1988) include three species of *Carychium* and indicate that they follow Burch and Van Devender; Dourson [2010] discusses six species. See Table 1.

As stated earlier, Burch (1962), Branson (1973), and Branson and Batch (1988) excluded *C. exile.* The latter two references are geographically limited to Kentucky, which was, naturally, of special relevance to my quest. The most recent entry (Dourson, [2010]) records *C. exile* as, "The most common *Carychium* in the state." I would like to note that Branson (1973: 32) seems to have little faith in the distinctions among *C. exiguum*, *C. clappi*, and *C. exile*, made by others (and likely himself) in the "Annotated List." Burch and Van Devender (1980: 62) note Branson and name other authors who "have not treated *C. exile*, *C. exile canadense* as being distinct forms from *C. exiguum*." Branson (1973) cited Hubricht (1963), "*Carychium exile* and *Carychium exiguum*" in his references, but he does not seem to follow the author, who states he has found the two species living together and could always separate them. *Carychium exiguum* is a more northern species reaching no further south than the Ohio River flood-plain. *Carychium exile* extends much further south (Hubricht, 1985). *Carychium exiguum* has a smoother and more obese shell than *C. exile*. The best distinguishing character, according to Hubricht (1963), is the outer lip. In *C. exiguum* it is expanded, but in *C. exile* it is narrowly reflected. Hubricht further states this difference is constant and stands up when other characters fail. Branson (1973: 32) leaves little by way of explanation in his discordant discussion.

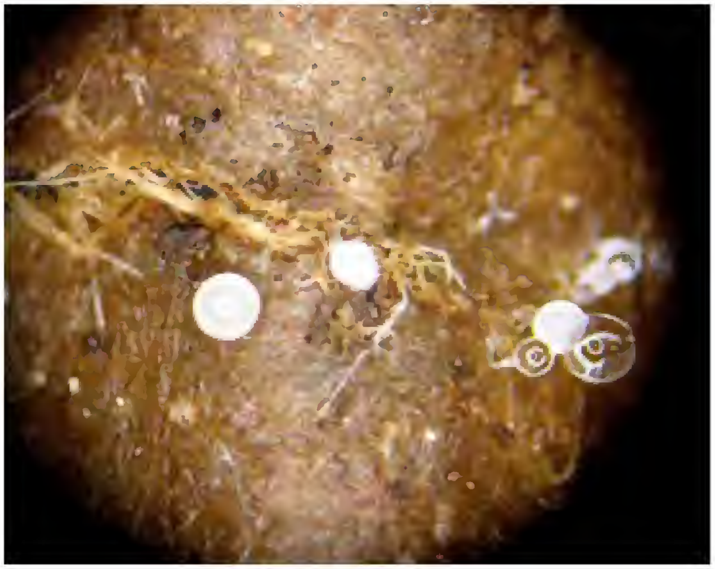
In Nekola and Barthel (2002), a statistical analysis of *C. exile* and *C. exiguum* in the Great Lakes region, demonstrates through the use of histograms, canonical discriminant analysis, scatterplots, measurements of shell height and width, smooth versus striate shells, and images, that the two species are separate and distinct. That is a tremendous amount of work for a < 2.0 mm land snail, and not easily applied. They attribute the confusion between the two, in part, to variable shell striations over shell dimensions and latitudinal variations occurring in northern and southern populations.

Most recently, Weigand, Jochum, and Klussmann-Kolb (2014) undertook a comprehensive morphological and molecular genetic study which revealed considerable conchological variability within species. Their results call into question traditional morphospecies concepts applied to *Carychium* by previous workers [including me and the various authorities discussed above].

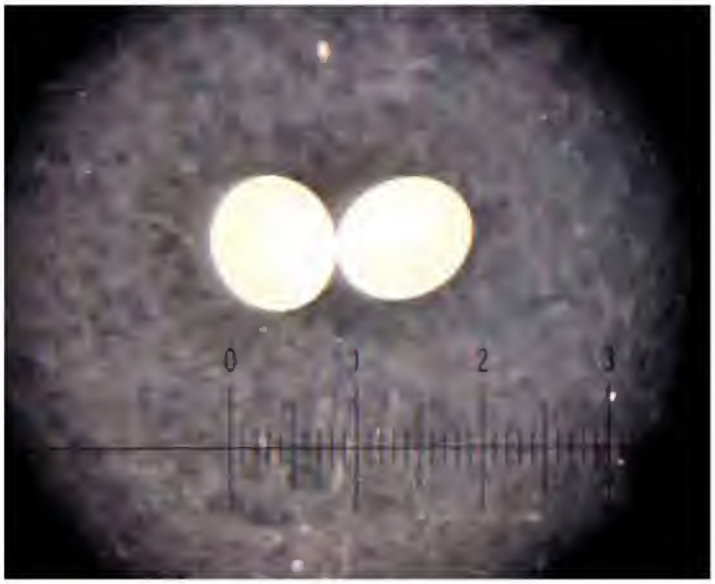
Table 1.

***Carychium* species**	**Pilsbry**	**Burch**	**Branson**	**Burch and Van Devender**	**Hubricht**	**Branson and Batch**	**Dourson**
exiguum	X	X	X	X	X	X	X
stygium	X	X	X	X	X		X
nannodes	X	X	X	X	X	X	X
floridanum	X	X					
exile	X			X	X		X
exile canadense	X			X	X		
exile mexicanum	X			X	X		
occidentale	X						
clappi				X	X	X	X
riparium				X	X		X

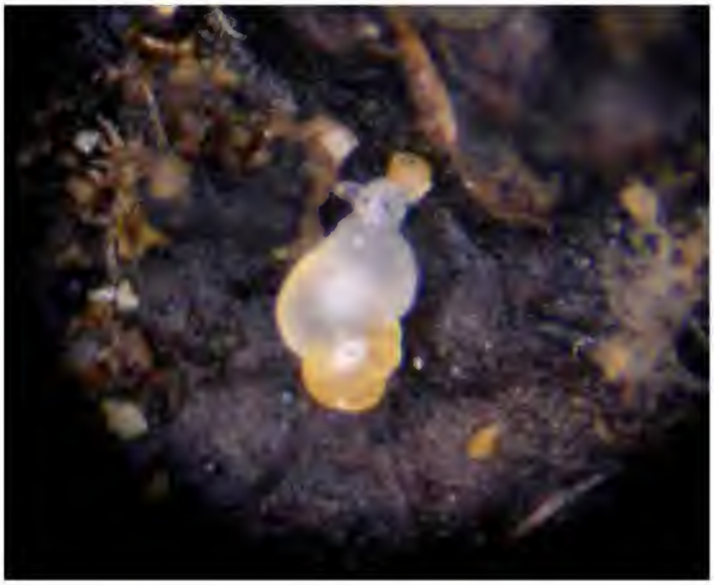
Without getting into another dimension of *Carychium* taxonomy, the internal lamellae (Pilsbry, 1948, etc.), and considering the volume of literature cited, my attempting to parse my *Carychium* by species is an overreach. Nonetheless, I now return to the *Carychium* culture.



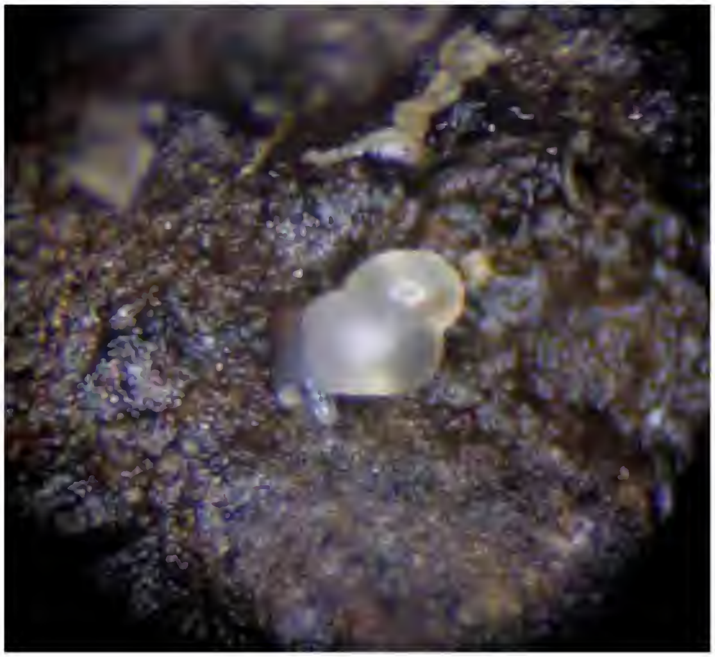
Discussions with Dr. Harry Lee and William Frank, Jacksonville, FL, were exchanged regarding the objects in the photo. The consensus was that the spherical object on the left was a newly deposited ovum. The rest was fungus or some other unidentified growth.



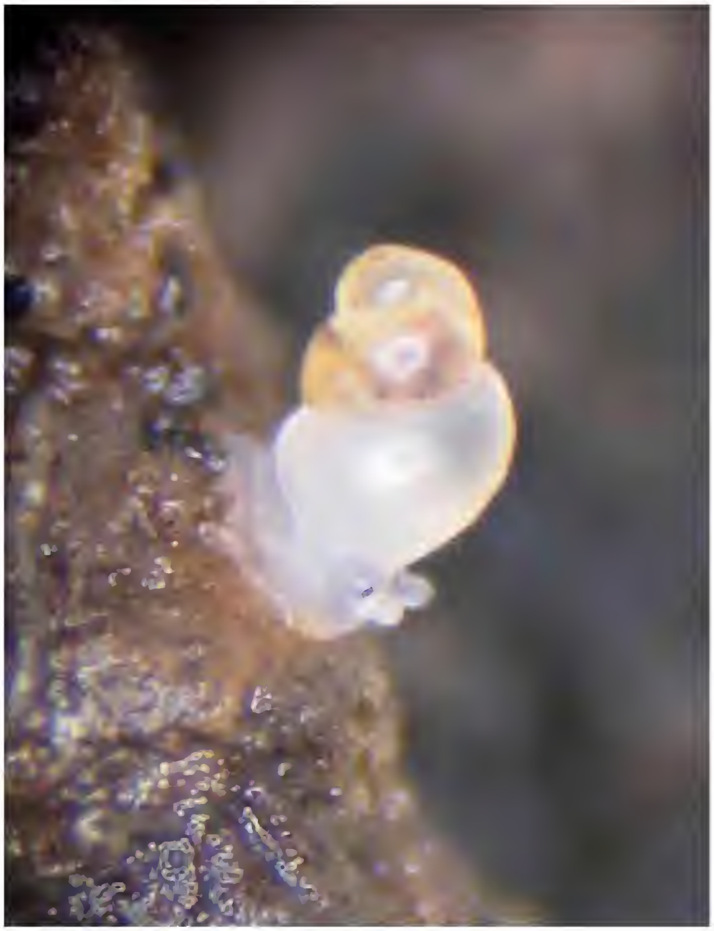
Carychium **ova measuring approximately 1.0 mm each.**

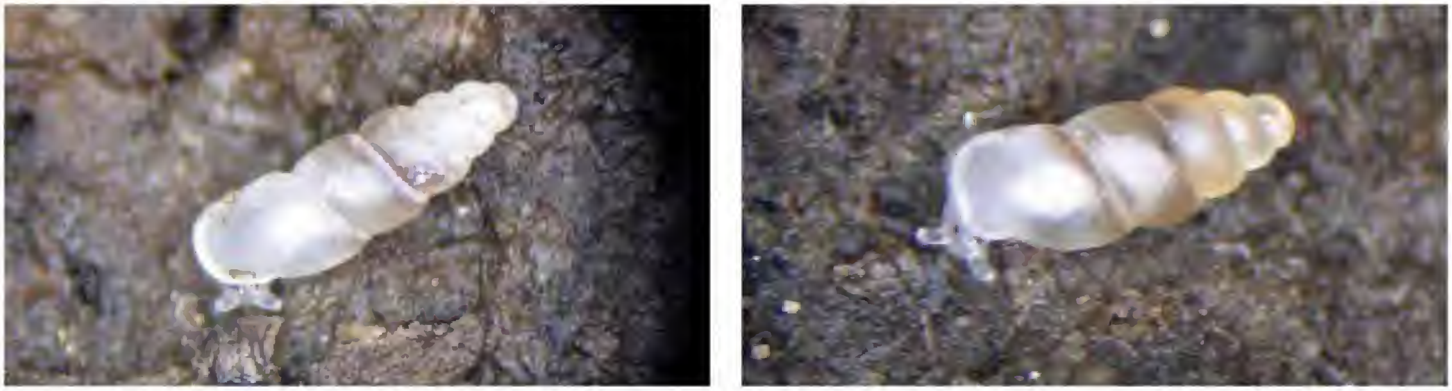


This baby *Carychium* is less than 1.0 mm. The tiny black spots on the head in between the tentacles are the snail's eye spots.



Above is a newly hatched baby. The specimen on the right is roughly a couple weeks old. The juveniles would disappear into either end of the bark and remain hidden from view for days or weeks. The yellow hued area near the shell's apex is the liver.





On 10 January, 2014 two fully matured *Carychium* snails were observed. The sessile eyes are located at the base of the tentacles towards the shell. Both individuals were hatched from eggs laid by a single adult specimen in July 2013. Notice the snail in the left image has a one whorl size advantage. Due to both the minute stature and shell morphology, identification can be quite challenging with this genus.

This exercise in gastropod husbandry was revealing and taught me a lot about terrestrial malacology. First and foremost, land snails are resilient. Given a suitable habitat with proper humidity, *Carychium* can tolerate living in captivity with little human assistance. Down to the youngest juvenile, all the snails exhibited a marked photophobia, a condition that limited access to the snails for observation and photography. Mortality was a certain 100% if individuals crawled away from their tree bark habitat. An unexpected by-product of the work was the demonstration that observed shell variability, even within what seems to be a single-parent clutch, appears to be confirmed by state-of-the-art molecular taxonomy.

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The 2016 St. Petersburg Shell Club Shell Show

Cheryl Jacobs holds her Conchologists of America Award for her winning display of 'A Study of Tiger Cowries."

Some of the 2016 winners...

- Conchologists of America Award: 'A Study of Tiger Cowries' – Cheryl Jacobs
- DuPont Award: 'Colors of Worldwide Molluscs' – Earl & Carolyn Petrikin (also People's Choice Trophy)
- Florida Museum of Natural History Award: 'Introduction to the Elongated Cockle' – Martin Tremor, Jr.
- Shell of the Show: *Amoria grayi kawamurai* Habe, 1975 – Jim Cordy
- Shell of the Show (self-collected): *Murexsul zylmanae* (Petuch, 1993) – Jim Cordy
- Selma "Sammy" Lawson Award: 'Colors of Worldwide Molluscs' – Earl & Carolyn Petrikin
- Best Scientific Exhibit (less than 10 feet): 'I'm older than you' – Alan Gettleman
- Alice Monroe Educational Award: 'Etymology of Cone Shells' – Harry Berryman
- Judge's Special Scientific Award: 'Alum Bluff Group' – Ron Bopp & Spiney Species of the Genus *Hysteroconcha* – Alan Gettleman
- Judge's Special Artistic Awards: 'Pictures' – Caryl Renz & 'Priscilla' – Caryl Renz
- Single Specimen (self-collected): 1st, *Murexsul zylmanae* – Jim Cordy; 2nd *Perna viridis* (Linnaeus, 1758) – Carolyn Petrikin

Earl & Carolyn Petrikin won the DuPont Award, the Selma "Sammy" Lawson Award, and the People's Choice Award for their display titled 'Colors of Worldwide Molluscs.'

Martin Tremor, Jr., with the Florida Museum of Natural History Award for his display titled 'Introduction to the Elongated Cockle.'

- Single Specimen Worldwide: 1st *Amoria grayi kawamurai* – Jim Cordy
- Educational: 1st ' Etymology of Cone Shells' – Harry Berryman; 2nd 'I'm older than you' – Alan Gettleman
- Fossils: 'Alum Bluff Group' – Ron Bopp
- Land & Freshwater: 'Unique Land Snail' – Alan Gettleman

The 2016 Sanibel Shell Show

Joyce & Ken Matthys, King City, Oregon, with their Conchologists of America Award. They also won a Judge's Special Ribbon for "Sea Butterflies."

The 2016 Sanibel Shell Show featured 90 scientific exhibits and 216 artistic exhibits. The exhibitors came from 16 states and three foreign countries (Canada, Japan and Barbados). The states included California, Colorado, Connecticut, Florida, Illinois, Indiana, Maine, Maryland, Minnesota, New York, North Dakota, New Hampshire, Oregon, Pennsylvania, Texas, and Wisconsin. Some of the winners were:

- DuPont Trophy, Most Outstanding Entry – Greg Curry, Sr., Key West
- Conchologists of America Award, Entry That Best Furthers Interest in Shells & Shell Collecting - Ken & Joyce Matthys, King City, OR
- Best Sanibel/Captiva Shells, Self-collected – Bruce Schulz, Fort Myers/Eugene, OR
- Best Florida/Caribbean Shells, Any source – Amy Tripp, Marco Island/Westport, MA
- Howard Sexauer Award, Best Worldwide Shells, Any source – Pat & Bob Linn, Dunedin
- Marilyn Northrop Award, Best Self-collected Single Shell - Amy Tripp, Marco Island/Westport, MA
- Eugene & Evelyn Spencer Award, Best South Pacific Shell - Greg Curry, Sr., Key West
- Shell of Show, Any source - Greg Curry, Sr., Key West
- Shell of Show, Fossil – Sammy Miller, Marco Island
- Elsie Malone Award, Best Student Exhibit - Marissa Linn, Indianapolis, IN
- Best of the Blues – Irene Longley, St. James City

Greg Curry, Sr., Key West, Florida, with his DuPont Trophy. He also won the Most Outstanding Entry – Eugene & Evelyn Spencer Award, Best South Pacific Shell – Shell of the Show – Any source, and a Judge's Special Ribbon.

Anne Joffe with the Anne Joffe Sanibel Superstar Award, named in her honor when she retired from actively working on the Sanibel Shell Show Committee. She also won the "People's Choice Award."

- Anne Joffe Superstar Award – Anne Joffe, Sanibel
- Judge's Special Ribbons
  - Greg Curry, Sr., Key West
  - Ken & Joyce Matthys, King City, OR

The 2016 Sarasota Shell Show

Pat and Bob Linn win the DuPont Award and Most Beautiful Scientific Exhibit with their dispaly, "The Helmetted Bonnets of the World."

David Ervin wins the Young Scientist Award for his display, "Fossiling in the U.S.A."

Ron Bopp accepts the Hertweck Best Fossil Exhibit from Sally Peppitoni for his exhibit, "Fossil Mollusks of the Tamiami Formation."

Greg Curry Sr. accepts the Mote Gold Trophy from Sally Peppitoni for his display on *Amoria*.

Some of the 2016 winners...

- COA – "Introduction to Elongated Cockles" by Martin Tremor and Conrad Forler
- Mote Gold – *Amoria* by Greg Curry Sr.
- Morrison Young Scientist – "Fossiling in the USA" by David Ervin
- Hertweck Best Fossil Exhibit – "Fossil Mollusks of the Tamiami Formation" by Ron Bopp
- Best Small Scientific Exhibit – "ID Guide to Microshells" by Duane Kauffman
- Sarasota Shell Club Member's Award – "Etymology of Cone Shells" by Harry Berryman
- Best Self Collected Exhibit – "Miniatures of Siesta Key" by Duane Kauffman
- Most Beautiful Scientific Exhibit – "The Helmeted Bonnets of the World" By Pat and Bob Linn
- Judge's Special Merit – "Giant Limpets" by John Jacobs
- Judge's Special Merit – "Caecidae" by Duane Kauffman
- Shell of Show – *Tenebrincola cukri* by Greg Curry
- Self Collected Shell of Show – *Scaphella junonia* by Pay Linn
- Fossil Shell of Show – *Extractrix* by Linda Ervin

The 2016 Marco Island Shell Show

Amy Tripp wins the Conchologists of America Award for Florida/Caribbean Self-collected Shells (below).

Some of the winning displays:

- The DuPont Trophy - Phil Miller
- Conchologists of America Award - Amy Tripp
- USF Best World Wide Single Shell Any Source - Greg Curry, Sr
- Top Novice Scientific Trophy - Karen Ackerman
- Best Miniature Shell(s) Trophy (any source) - Amy Tripp

Greg Curry, Sr. won a blue ribbon and the Doctor William Reid Plaque for this amzing (six case) display of *Amoria*.

Phil Miller won the DuPont Award and the Outstanding Self-collected Marco Island Shell Collection.

- Outstanding Self-collected Marco Island Shell Collection - Phil Miller
- FGCU Best Marco Island Single Shell Self-collected - Bill Tripp
- FGCU Natural History Photographic Award - Amy Tripp
- FORB Best Florida/Caribbean Shell Self-collected - Sammy Miller
- Two Judges Merit Ribbons - Amy Tripp & Greg Curry, Sr.
- People’s Choice Award (scientific) - Marge Tunnell

COA CONVENTION 2016

CHICAGO!

The Chicago Shell Club is anxiously waiting to greet you to Shellebrate Chicago. We have a great shellebration planned for you. We will start off with our pre-convention field trips. They are filling up fast, so don't miss out. For complete information about the field trips, go to www.conchologistsofamerica.org.

Cloud Gate also known as "The Bean" in Millennium Park, Chicago, IL

You can also venture out on your own. Chicago has much to offer from shopping to wonderful museums. The Chicago Outlet Mall is just outside from the hotel, so you can visit any time. The Magnificent Mile is just a short train ride away. The Art Institue, Adler Planetarium, Chicago History Museum, Buckingham Fountain, Willis Tower, Millennium Park with "The Bean," Historic Water Tower, and Hancock Observatory are only a few of the many things to see in Chicago. Why not catch a Cubs baseball game while you are here. They are in town that week.

China's First Emperor and his Terracotta Warriors (right) will be on exhibit at the Field Museum of Natural History this summer. Why not take time when you are here for the 2016 COA to see this fabulous exhibit.

The first day of the 2016 COA Convention will include our Welcome Party being held under ***Lucy*** at the Field Museum of Natural History. This will be an exciting event. This year's theme is "shell attire". So pull out those shirts and dresses with shells to show them off! Ladies, we hope to see some of your fabulous shell jewelry. The Welcome Party includes a buffet dinner, open bar and time to wander through a few of the exhibits open especially for us.

Those who go on the Field Museum Field Trip on Monday, July 25th will have the opportunity to tour the Field Museum exhibits after the tour, and can purchase reduced price tickets to see the Terra Cotta Soldiers exhibit . If you want to do this you must contact Jochen Gerber at jgerber@fieldmuseum.org.

We will have some new speakers this year. Please take time to attend the many informative sessions. Our program schedule is shaping up. The **tentative** schedule will be:

COA 2016 July 27-31, 2016

Monday, July 25 –

9:00am-2:00pm field trip: Field Museum of Natural History

2:00pm-7:00pm field trip: John G. Shedd Aquarium

(You can do both of these field trips in one trip, the Museums are across the street from each other)

Tuesday, July 26 –

9:00am–2:00pm field trips: Museum of Science and Industry or Lincoln Park Zoo

1:00pm-5:00pm: Registration at hotel

2:00pm-6:00pm field trip: Architectural Boat Tour

5:00pm-10:00pm field trip: Dinner Cruise, Lake Michigan

(You can do the morning and afternoon field trips without returning to the hotel)

Wednesday, July 27–

8:00am-10:00am: Registration

10:00am: Opening Ceremonies followed by talks (time for lunch included)

1:00pm: Silent Auction begins

6:00pm: Board bus for Welcome Party at the Field Museum of Natural History

7:00pm-10:00pm: Welcome Party

Thursday, July 28 -

7:30am-8:45am: Club tables

8:00am: 2nd Silent Auction begins

9:00am-4:00pm: Presentations with break for lunch

2:00pm: 3rd Silent Auction begins

7:00pm: Oral Auction (preview at 6:30pm)

Friday, July 29 –

8:00am: 4th Silent Auction begins

9:00am-3:30pm: Presentations with break for lunch. End with COA Annual Meeting

2:00pm: 5th Silent Auction begins

6:00pm-10:00pm: Banquet

Saturday, July 30 -

7:30am-12:30pm: Bourse set-up

8:00am-9:45am: Club Rep breakfast meeting

1:00pm-8:00pm: Bourse

Sunday, July 31 –

9:00am-2:00pm: Bourse

Monday & Tuesday, August 1-2 -

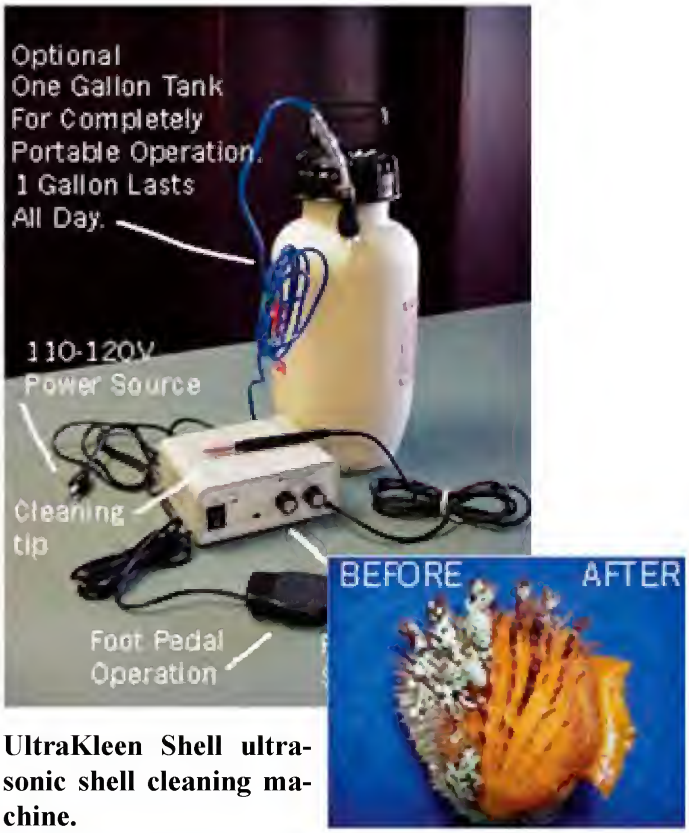
Post-convention Field Trip

Join us in a post-convention shelling trip in the area. Plans are being made to explore land and freshwater shelling. All you have to do is express interest in joining us. There is no commitment and no up-front cost.

Don't miss our **Oral Auction** on Thursday night. We have some wonderful things for you to bid on. You will be provided with a booklet with pictures of all the items at the time you register. Here are a few to look forward to:

***Harpa costata* – 86mm!!**

Deep water *Conus lorenzianus* -- 68.2mm, w/o, trawled off Honduras.

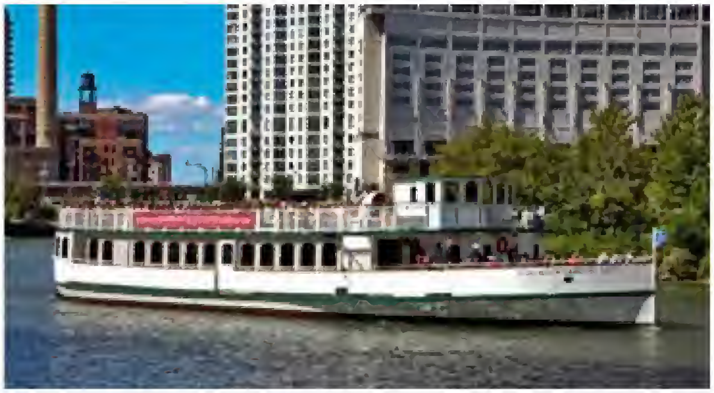


UltraKleen Shell ultrasonic shell cleaning machine.

Bid on a dive in a submarine to 2000 feet to collect Pleurotomarias in the Caribbean.

MANY, MANY MORE!!! PLUS EXCITING FIELD TRIPS!!

FIELD MUSEUM OF NATURAL HISTORY: A once in a lifetime opportunity to see the behind-the- scenes view of the fantastic shell collection of the Field Museum.



ARCHITECHTURAL TOUR ON THE CHICAGO RIVER: The Chicago Architecture Foundation River Cruise is consistently recognized as the best way to see Chicago. Learn about the architecture and design of over 50 buildings as described by CAF-Certified Volunteer Docents/Guides on this 90-minute tour. Open-air and air-conditioned seating is available. Full Service Bar onboard each vessel. Board the bus at the convention hotel at 2:00 pm; return to the hotel at 6:00 pm. https://www.youtube.com/watch?v=cH-ZDcGpZNs

MUSEUM OF SCIENCE AND INDUSTRY: It is the largest science museum in the western hemisphere. On its 350,000 square feet (approximately 8 acres), it presents over 2,000 exhibits in many fields, including technology, agricultue, transportation, energy, and communications. Featured attractions include a working replica of a coal mine, the Henry Crown Space Center and the German WWII submarine U-505. Boarding at 9:00 am at the convention hotel; return to the hotel at 2:00 pm. http://www.msichicago.org/

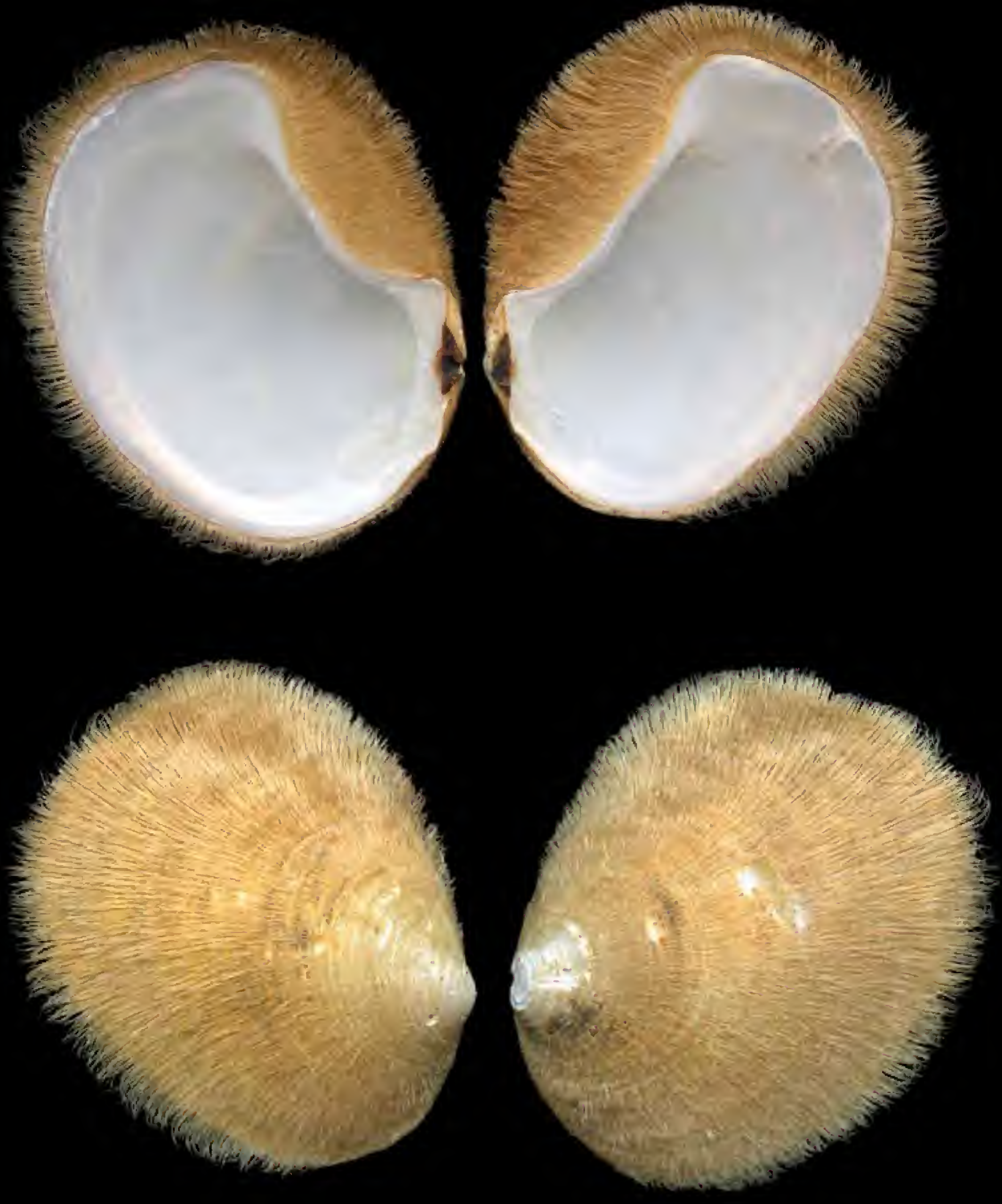
LINCOLN PARK ZOO: Founded in 1868, is one of the oldest zoos in the U.S. The zoo's exhibits include big cats, polar bears, penguins, gorillas, reptiles, monkeys, and other species totaling about 1,100 animals from some 200 species. Its Conservation & Science Department runs one of the largest zoo-based research and conservation programs in the country. See unique exhibitions, such as the African Journey and the Center for African Apes and get behind-the-scenes access to areas usually closed to the public. Boarding at 9:00 am at the convention hotel; return to the hotel at 2:00 pm. http://www.lpzoo.org/

JOHN G. SHEDD AQUARIUM: The aquarium contains 32,000 animals representing 1500 species including fish, coral, marine mammals, birds, snakes, amphibians, and insects. The tour offers access to the permanent exhibitions including the Wild Reef (the recreation of a Philippine coral reef), Amazon Rising (repesenting the Amazon River and the surrounding jungle) and an aquatic show in the Oceanarium featuring belugas, dolphins, sea lions and dogs. Boarding at 2:00 pm at the convention hotel; return to the hotel at 7:00 pm. This tour can be combined with a visit to the Field Museum in the morning of the same day. http://www.sheddaquarium.org/

LAKE MICHIGAN DINNER CRUISE: Chicago's world-famous skyline is best enjoyed from the waters of Lake Michigan. The casual, yet lively, atmosphere of a *Mystic Blue* Dinner Cruise in Chicago is a terrific way to cap off the day with a group of friends. Watch the sun set on the horizon and the Chicago skyline light up as you enjoy panoramic views including iconic sights like Willis Tower, Navy Pier and John Hancock Center. Savor a delicious buffet dinner on board the *Mystic Blue* and have a drink from the cash bar while taking in the unparalleled view of downtown Chicago. See all the details at: http://www.mysticbluecruises.com/chicago/cruises/specialty/lake-breeze

POST-CONFERENCE FIELD TRIP, AUGUST 1 & 2: We are planning a two day land and freshwater collecting trip to the Mississippi on Aug. 1-2, staying in a local hotel overnight. We will arrange for transportation and will make a hotel reservation. If you are interested in participating you must send an email to jgerber@fieldmuseum.org. Please indicate whether you need transportation or plan to drive your own car. In the latter case, please also let us know whether you will drive back to Chicago and if so, how many passengers will you be able to accommodate.

See you in Chicago!



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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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2017 COA CONVENTION

Key West, FL

August 15 - 19, 2017

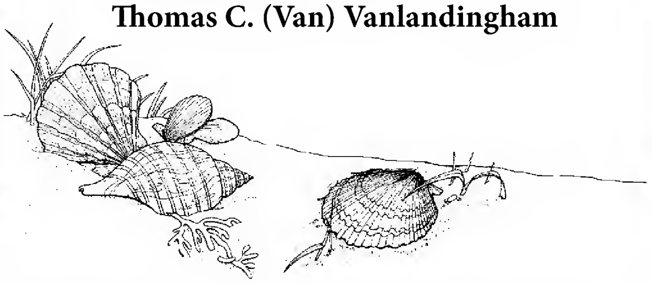
Grand Key Resort

Doubletree By Hilton

Pre-Convention Field trips August 13 and 14
Bourse August 18 and 19

In memoriam:

Bruce Crystal (see p. 38)
Anne Marrou
Phil Poland (see p. 33)
Thomas C. (Van) Vanlandingham



Front cover: *Ovatipsa chinensis* (Gmelin, 1791) (the Chinese cowry, 27mm), photogarphed at night in Ambon Bay, by Charles Rawlings. For details of his trip to Ambon, and more great mollusk photographs by Charles, see his article starting on p. 4.

Back cover: *Diminovula culmen* (Cate, 1973), is a small ovulid (10-13mm) and like most of this family is much more colorful in life with its mantle fully extended than when viewed as the dried shell. This is also a photograph by Charles Rawlings from his Ambon trip.

A trip to Ambon or the quest for a living Bednall's volute

Charles E. Rawlings, M.D., J.D.

It was a dark and stormy night; the seas were a washing machine of mixed waves and currents – no, wait a minute, that's actually another story. Here the bay was a plate of still 82° water, reflecting the night sky in all its brilliance. Four divers, Lynn Murphy, Carl Ehrlich, Denise Lute, and myself, did slow back-rolls into the warm inky dark water. The slow, almost hypnotic, purring of our regulators was the only sound. The clear water was illuminated by shafts of light from our torches. We gently hovered over the top of a dark sand slope at 30 feet and then slowly began to descend following the slope, which was scattered with coral bommies, soft coral trees, and coral rubble. Then, of course, there were the shells – literally dozens of them – cones, harps, cowries, murex, bat volutes – to mention but a few. We did multiple night dives in Ambon and each night we enjoyed a similar experience. Even our day dives were filled with wonders, ranging from murex on shipwrecks to small ovulids in soft corals whipped by current. That was diving in Ambon. Of course traveling there is a bit of an effort.

Indonesia is the largest island country in the world, consisting of more than 13,000 islands, and is the most populous Muslim-majority country with a population of more than 255 million, of which over half live on the island of Java. Indonesia stretches from Sumatra in the west to Irian Jaya in the east and includes Borneo, Java, Bali, Sulawesi, and Ambon, along with the Malukus (Fig. 1). As can be imagined, being a tropical island nation, the molluscan fauna should be diverse and expansive. Moreover, during the past several years, *Volutoconus bednalli* (Brazier, 1878), Bednall's volute, has supposedly been collected in that region, or at least labeled as Indonesian. Because photographing a living Bednall's is almost my holy grail, I decided to search it out. Thus the trip to Ambon in the heart of the Malukus. In addition, both the Wallace and Weber lines indicate that Bednall's and other semi-Australian fauna could be found in that area (see sidebar p. 7 & Figure 2).

The Maluku Islands, also known as the Moluccas, are the original Spice Islands in the Eastern Seas and were seized by the Dutch East India Company in the 1620s. From then on they were exploited for not only their spices but also their exotic objects including shells. Accompanying this collecting zeal arose the art of describing the objects of curiosity, especially the natural history objects including shells. Among these noted descriptors was one of the first conchologists/malacologists, Georgius Rumphius (1627-1702). For almost 50 years, from 1653 until his death, Rumphius lived on Ambon, and provided detailed descriptions and illustrations of its natural history objects of curiosity, including mollusks. Rumphius authored two books with those descriptions: *Herberium Amboinese* (1741) and *D'Amboinsche Rariteitkamer* [*The Ambonese Curiosity Cabinet*] (1705). In 1868 the naturalist A.S. Bickmore travelled to the Malukus with *The Ambonese Curiosity Cabinet* in hand and confirmed the accuracy of Rumphius' original descriptions and illustrations (Bickmore, 1868). Most recently, H.L. Strack described similar results in the *Rumphius Biohistorical Expedition to Ambon* (1990), again confirming the accuracy of Rumphius and his conchological observations. These expeditions corroborate the accuracy of Rumphius and his observations, but do they verify the biogeographical diversity of Indonesian mollusks? According to both the Wallace and the Weber lines (and keeping in mind that both men based their faunal division largely on land vertebrates rather than mollusks), the Malukus should possess a molluscan fauna unlike that of Bali, Sulawesi, or even the Philippines.

Lynn Murphy and I arrived in Ambon after 30 hours of flying and an overnight in Jakarta with its pouring rain. As an aside, Jakarta had, once again, suffered a terrorist assault only weeks before – see the bombing of Starbucks. I, however, never encountered or experienced any animosity in this predominantly Muslim portion of the nation. People were apologetic if anything. The people of Ambon are delightful

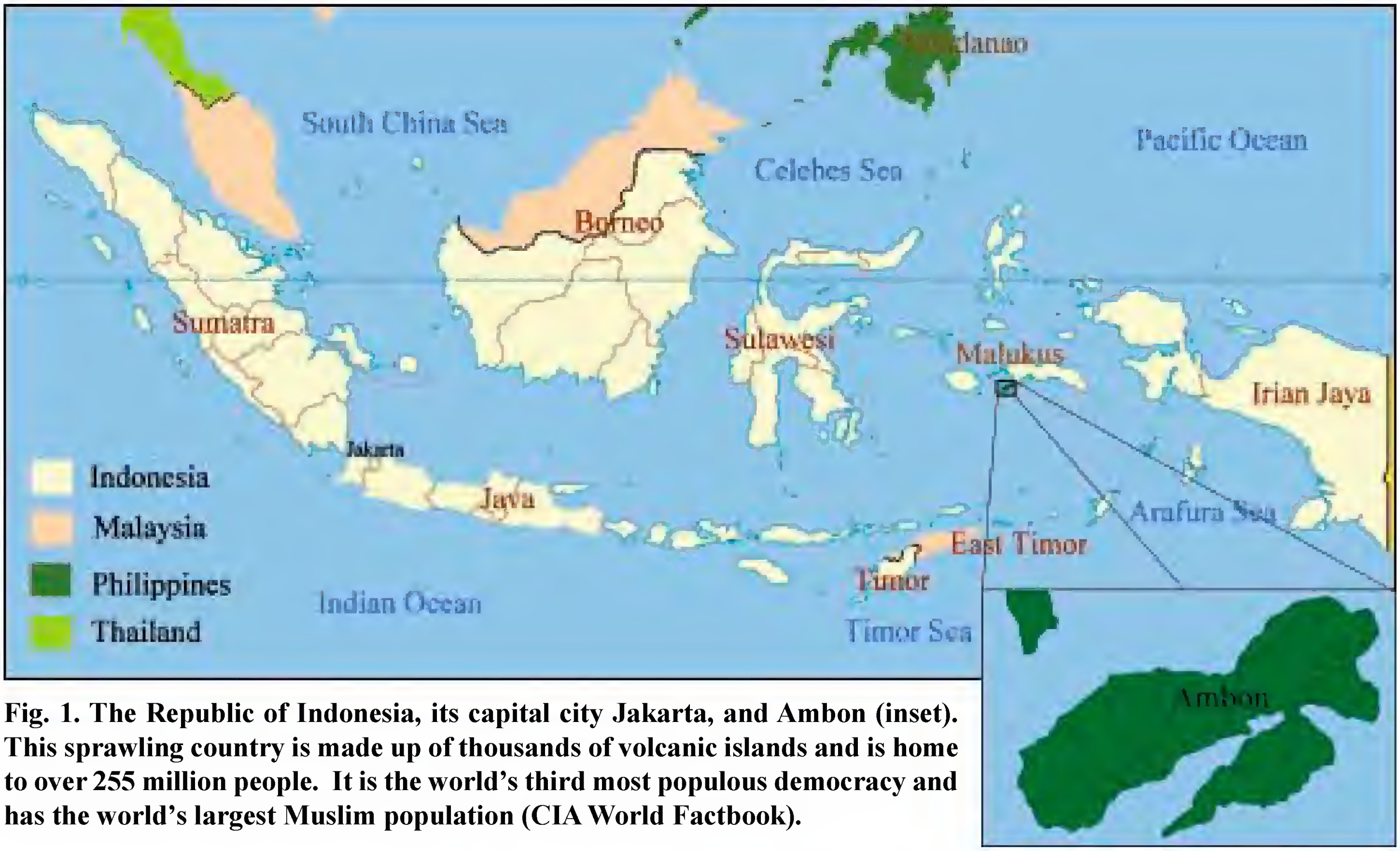


Fig. 1. The Republic of Indonesia, its capital city Jakarta, and Ambon (inset). This sprawling country is made up of thousands of volcanic islands and is home to over 255 million people. It is the world's third most populous democracy and has the world's largest Muslim population (CIA World Factbook).

as were the staff of Maluku Divers who were to help us in our collecting. I also had several friends along, Lynn Murphy and the Ehrlichs, to assist in finding and documenting as many molluscan species as possible. That we did, finding over 130 species of mollusks during our eight days of diving. Alas, these were not species unique to Ambon, but the murex, cones, cowries, and ovulids were both plentiful and diverse – a known characteristic of the Malukus (species lists 1-4).

Leaving the torrential rain in Jakarta, I arrived in Ambon, to warmth, sunny skies, and an eagerness to dive. Over the next eight days we averaged between three and four dives a day, and almost always added in a night dive. Between the four of us, we totaled over 150 hours underwater, about 30 of which were done at night. The dives were primarily done in the large bay that almost splits the island of Ambon in half (Fig. 1). We also managed

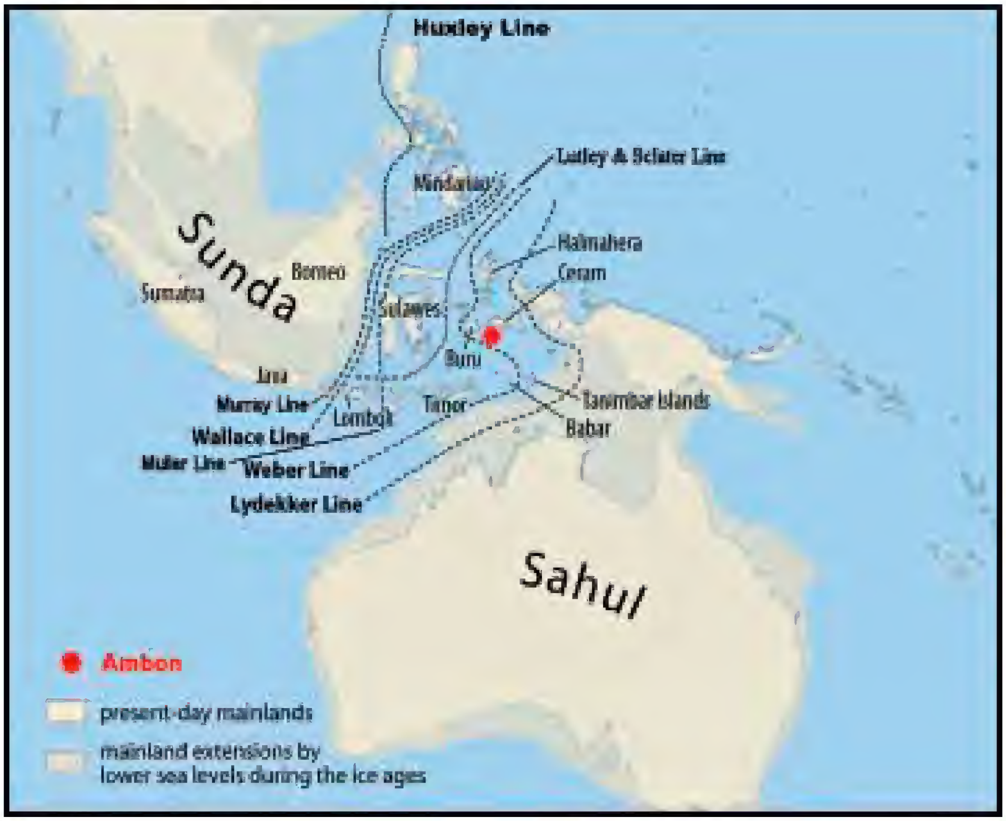


Fig. 2. The Wallace Line (and everyone else's as well). The important thing to note is that all but Lydekker place Ambon in the Australian biogeographical region. For further explanation see sidebar p. 7.

dives along the outside of the island. Such dives are almost never available due to poor weather, prevailing winds, large waves, and unpredictable currents. Nonetheless, we were fortunate enough to have several days that allowed us to dive on the outside reefs of Ambon.

While diving in Ambon and the Malukus is generally described as "muck" diving, the fact is that almost all tropical underwater habitats can be found in Ambon. Our dive locations varied from almost pure sand and mud with trash, to exquisite virgin coral reefs. The habitats inside the bay ranged from true "muck" diving (looking for mollusks over a featureless sand and mud slope while dodging garbage) to carpets of *Halimeda* hard algae, hydroids, and fields of lush, soft coral open in the raging current. We also dove several wrecks ranging from WWII to recent, piers, and even pillars of coral. On the outside of the island we dove several giant pinnacles and sheer walls of virgin coral reef, all bathed in a two knot current. In addition, due to the large tidal exchange, Ambon Bay is subject to serious currents, and some dive sites must be timed based on the current. Of course the best soft coral and their associated ovulids are located in the sites with the most ferocious currents. As a result some of my photographs were obtained in a stiff current, balancing a large camera, attempting to focus on a creature not much larger than a grain of sand. Regardless, we were able to investigate almost every habitat within divable range. No habitat went uninvestigated and our diving depths averaged around 60 feet, ranging from about 20 feet in the shallows while I once hit 130 feet in the depths of a WWII wreck.

As noted above, we were able to document over 130 species of mollusks. These ranged from the common species encountered across the Indonesian/Filipino (Indo-Malayan) biogeographical area, to the obscure ovulids. In fact, I was able to photograph several species of ovulids and *Simnias* which are unidentified. In addition, the cephalopods were also well represented during our dives. Almost every cephalopod encountered in the Indonesia and Filipino area can be found in Ambon and the Malukus. These ranged from common reef squid to many of the octopus species, including: *Octopus cyanea* Gray, 1849 (the day octopus), *Amphioctopus marginatus* (Taki, 1964) (the coconut octopus), *Thaumoctopus mimicus* Norman & Hochberg, 2005 (the mimic octopus), and *Wunderpus photogenicus* Hochberg, Norman & Finn 2006 (yes, that is its actual scientific name, commonly called the wonder octopus). I was able to identify three cuttlefish species: the common *Sepia latimanus* Quoy & Gaimard, 1832 (the broadclub cuttlefish), *Sepia bandensis* Adam, 1939 (the uncommon dwarf cuttlefish), plus my favorite *Metasepia pfefferi* (Hoyle, 1885) (the flamboyant cuttlefish). Surprisingly, a species of *Nautilus* is also found along the outside reef of Ambon, *Nautilus pompilius* Linnaeus, 1758 (the chambered nautilus). While we set several traps over several nights, we did not trap any of these elusive creatures. We did, however, find their shells washed up on the beaches facing the outer reefs.

Let's turn to the issue of Bednall's volute, a mollusk that should be found in Ambon and the Malukus based upon biogeography and reports. In short from what I observed, this mollusk is not found in the area and seems to be restricted to the Australian biogeography. Bednall's volute is a rather rare shell that is found, by report, between 20 and 100 feet on a sandy silt with mud bottom. Most specimens are brought up by commercial fishermen and shrimpers, and its early biogeography was primarily the Arafura Sea just north of Darwin. More modern reports have it also occurring in Indonesia in the Maluku Islands. The animal appears never to have been photographed alive (thus my quest). Bednall's is apparently not located in Ambon or any of the nearby islands. After speaking with local collectors, fishermen, and shrimpers, they have never encountered one in the area. In addition, having placed several fish traps at varying depths in Ambon Bay, Bednall's were never found in the catch. The point of all this information is that, from a biogeographical standpoint, while both Wallace's and Weber's lines may define a general area of faunal occurrence and maybe even a limit, they do not define an actual range for Bednall's Volute. Moreover, they do not seem to apply to most of the molluscan species in and around Ambon. Bednall's volute should be found in the area around Ambon especially Ambon Bay. The bottom is appropriate (sandy silt with mud), the current is adequate, food is plentiful (harps, another carnivorous mollusk, were encountered on almost every night dive), and the depth range is suitable. In short, while Bednall's volute should occur in the waters around Ambon, it does not.

Clearly neither Wallace's nor Weber's lines apply to most of the Ambon molluscan fauna with regard to biogeography. Ambon is on the Australian side of the lines, but the fauna is more Asian. Bednall's, if it is indeed located in Indonesia, must be found further south, in those islands almost adjacent to and within the Arafura Sea. Bednall's must truly be located in the Australian biogeography locale, southeast of both Weber's and Wallace's line. As a result, Bednall's must be found around Darwin or the very southern Malukus.

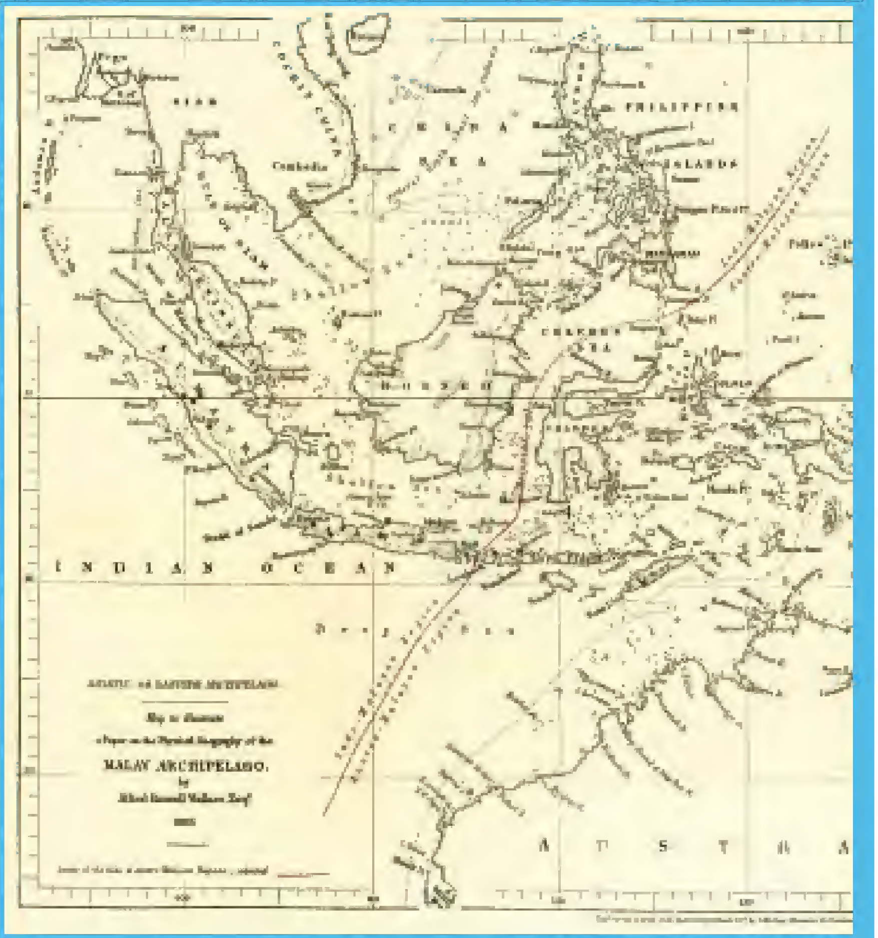
So we didn't find, collect, or photograph Bednall's volute. We still were able to collect hundreds of shells and I was able to obtain multiple photographs of truly unique mollusks. One day we would be diving shipwrecks finding map cowries and plucking large specimens of murex from the crumpled remains of once ocean-going ships. On one such dive I was able to essentially pick and choose the best specimens of *Chicoreus brunneus*, *C. palmarosae*, *C. saulii*, and *C. torrefactus* on two dives. Another day we would be diving the outer reefs and bays being entranced by the beauty of pristine coral reefs and the associated shells including cones, *Lambis*, *Strombus*, and cowries. Other days would be spent

Wallace Line

The Wallace Line or Wallace's Line is a notional biogeographical boundary proposed by Alfred Russel Wallace (1823-1913) that separates the faunal ecozones of Asia and Australia. Wallace's Line runs from off the northwest coast of Australia, through the Indonesian Islands (an area called Wallacea), to the southeast of the Philippine Islands. It divides the Indonesian Islands southeast of Borneo and northwest of Sulawesi. During extensive travels in the area Wallace noticed that animals (mostly mammals, insects, and especially birds) differed between these two areas and it seemed the boundary was along the line he proposed. His theory was published as a paper he read to the Royal Geographical Society on 8 June 1863 (and published in volume 33 of their Journal of the Royal Geographical Society later the same year).

Wallace attributed this division to the breakup of a large continent into the Indonesian Islands of Sulawesi (his Celebes) eastwards (including Australia), and the expansion of Asia eastwards (largely through volcanic activity), including the Indonesian Island of Borneo. Wallace noted the deeper sea between these two groups and the shallower seas within each group. Plate tectonics and continental drift have since provided a more precise mechanism for the split (Oosterzee, 1997). Huxley proposed an extension of the Wallace line through the Philippines. Wallace was not the only (or even the first) to draw a line dividing the Indonesian Islands. Other lines were proposed by Salomon Muller in 1846, Murray in 1866, Thomas Huxley in 1868, Richard Lydekker in 1896, Lutley & Sclater in 1899, and finally Max Carl Wilhelm Weber (1852-1937) in 1902 (Oosterzee, 1997). Even Ernst Mayr got involved by redefining Weber's Line in 1944 (Oosterzee, 1997). In 1919, Weber (along with G.A.F. Molengraaff) named the two land masses connecting many of the islands in the area exposed by lower sea levels during the ice ages (Ballard, 1993). The land mass connecting Asia to Sumatra and Borneo was called Sunda and the land mass connecting Australia with Papua New Guinea and smaller islands was named Sahul. Both names had been used earlier and separately by other authors.

The term Wallace Line was actually coined by Thomas Huxley in 1868. Both Wallace and Huxley were contemporaries of Charles Darwin and much has been written about their various interactions, including their activities concerning the Theory of Evolution. Wallace is considered a co-discoverer of natural selection. He corresponded with Darwin about his findings, resulting in a joint presentation of scientific papers to the Linnean Society in London (*On the Tendency of Species to form Varieties* [Wallace]; and *On the Perpetuation of Varieties and Species by Natural Means of Selection* [Darwin]) in 1858. Darwin followed this up with the 1859 publication of *On The Origin of Species*. Although some authors have attempted to portray Darwin's publication as a usurpation of Wallace's ideas, both men had worked for decades developing their ideas of natural selection (a term not used by Wallace until Darwin's tome was published. Wallace felt privileged to be included in the presentation of his paper to the Linnean Society and considered Darwin a mentor and friend. In Wallace's *The Malay Archipelago* (1869) he wrote the following: "To Charles Darwin author of "The Origin of Species" I dedicate this book not only as a token of personal esteem and friendship but also to express my deep admiration for his genius and his works." This book is still in print.



in the large Ambon Bay where I would spend time photographing an assortment of ovulids, *Simnias*, and other assorted esoteric mollusks. Finally, every night, once the sun set and the water darkened, we would back-roll into a shell collector's paradise of nocturnal mollusks on the prowl, including cones, cowries, harps, tuns, and the list could go on. Again, for a more comprehensive species indexing, see the lists at the end of this article detailing the cones, cowries, ovulids and murex that we collected. There is no question that the trip was worth the 30 hours of flight time, the list of specimens and photographs speak for themselves. Finally, thanks must go to Maluku Divers where we stayed and with whom we dived. Coincidently, two of the very best creature spotters, Nus and Ali, now work and run the resort. We have dived with them for several years, starting a decade ago when they were at Kungkungan Bay Resort in Sulawesi. It felt like old times with the best in the world. If you have an opportunity visit Ambon and collect to your heart's content.

Table 1*
Cowrie Species from Ambon

Cribrarula cribraria (Linnaeus, 1758)
Cypraea tigris Linnaeus, 1758
Eclogavena quadrimaculata (J.E. Gray, 1824)
Erosaria erosa (Linnaeus, 1758)
Erosaria gangranosa (Dillwyn, 1817)
Erosaria helvola (Linnaeus, 1758)
Erosaria labrolineata (Gaskoin, 1849)
Erosaria miliaris (Gmelin, 1791)
Erronea caurica (Linnaeus, 1758)
Erronea cylindrica (Born, 1778)
Erronea errones (Linnaeus, 1758)
Leporicypraea mappa (Linnaeus, 1758)
Luria isabella (Linnaeus, 1758)
Lyncina carneola (Linnaeus, 1758)
Lyncina leviathan (M. Schilder & F.A. Schilder 1937)
Lyncina lynx (Linnaeus, 1758)
Lyncina vitellus (Linnaeus, 1758)
Mauritia arabica (Linnaeus, 1758)
Ovatipsa chinensis (Gmelin, 1791)
Palmadusta lutea (Gmelin, 1791)
Palmadusta ziczac (Linnaeus, 1758)
Staphylaea staphylaea (Linnaeus, 1758)
Talostolida teres (Gmelin, 1791)

*Taxa listed according to the World Register of Marine Species (WoRMS) available online at www.marinespecies.org. Thus *Erosaria* (Troschel, 1863) is used even though some consider it a junior synonym of *Naria* Broderip, 1837. The editors of WoRMS limit the use of *Naria* to *N. irrorata* (Gray, 1828) and *N. ostergaardi* (Dall, 1921) until such time as more extensive research further defines the phylogenetic position of the two genera.

Table 2*
Cone Species from Ambon

Conus (*Gastridium*) *geographus* Linnaeus, 1758
Conus (*Lividoconus*) *lividus* Hwass in Bruguière, 1792
Conus (*Pionoconus*) *consors* G.B. Sowerby I, 1833
Conus (*Pionoconus*) *monachus* Linnaeus, 1758
Conus (*Pionoconus*) *striatus* Linnaeus, 1758
Conus (*Puncticulis*) *arenatus* Hwass in Bruguière, 1792
Conus (*Rhizoconus*) *capitaneus* Linnaeus, 1758
Conus (*Rhizoconus*) *hyaena* Hwass in Bruguière, 1792
Conus (*Rhizoconus*) *miles* Linnaeus, 1758
Conus (*Rhizoconus*) *vexillum* Gmelin, 1791
Conus (*Splinoconus*) *capitanellus* Fulton, 1938
Conus (*Fraterconus*) *distans* Hwass in Bruguière, 1792
Conus (*Strategoconus*) *generalis* Linnaeus, 1767
Conus (*Elisaconus*) *litteratus* Linnaeus, 1758
Conus (*Pionoconus*) *magus* Linnaeus, 1758
Conus (*Conus*) *marmoreus* Linnaeus, 1758
Conus (*Gastridium*) *obscurus* G.B. Sowerby I, 1833
Conus (*Phasmoconus*) *parius* Reeve, 1844
Conus (*Strategoconus*) *striatellus* Link, 1807
Conus (*Cylinder*) *textile* Linnaeus, 1758
Conus (*Rolaniconus*) *varius* Linnaeus, 1758
Conus (*Virgiconus*) *virgo* Linnaeus, 1758

*Taxa listed according to the World Register of Marine Species (WoRMS) and Tucker & Tenorio (2009) to determine the use of the numerous genera and subgenera of Conidae.

Table 3*
Ovulids from Ambon

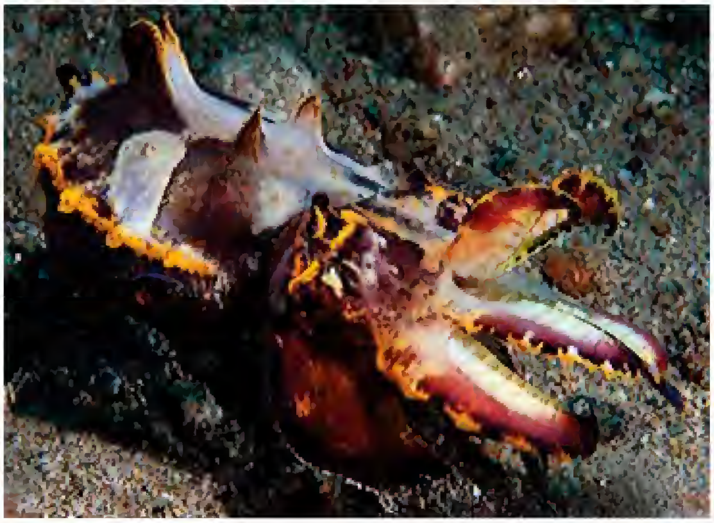
Calpurnus verrucosus (Linnaeus, 1758)
Cuspivolva tigris (Yamamoto, 1971)
Dentiovula aff. *eizoi* Cate & Azuma in Cate, 1973
Diminovula culmen (Cate, 1973)
Diminovula stigma (Cate, 1978)
Hiatovula rugosa (Cate, 1973)
Margovula marginata (G.B. Sowerby I, 1828) (syn. *Pseudosimnia sinensis* (G.B. Sowerby III, 1874)
Ovula ovum (Linneaus, 1758)
Phenacovolva rosea (A. Adams, 1854)
Phenacovula subreflexa (G.B. Sowerby II, 1848) (syn. *P. gracilis* (G.B. Sowerby II in A. Adams & Reeve, 1848))
Primovula rosewateri (Cate, 1973)
Serratovolva minabeensis Cate, 1975

*Taxa listed according to the World Register of Marine Species (WoRMS). The editors of WoRMS use Cate (1973) and Lorenz & Fehse (2009) to determine the use of the numerous genera and subgenera of Ovulidae.

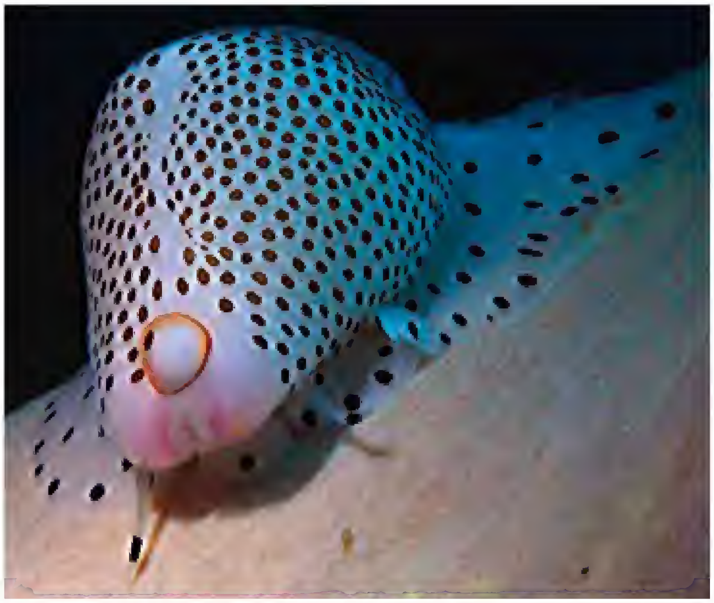
Table 4*
Murex Species from Ambon

Chicoreus brunneus (Link, 1807)
Chicoreus paini Houart, 1983
Chicoreus palmarosae (Lamarck, 1822)
Chicoreus ramosus (Linnaeus, 1758)
Chicoreus saulii (G. B. Sowerby II, 1841)
Chicoreus torrefactus (G.B. Sowerby II, 1841)
Haustellum haustellum (Linnaeus, 1758)

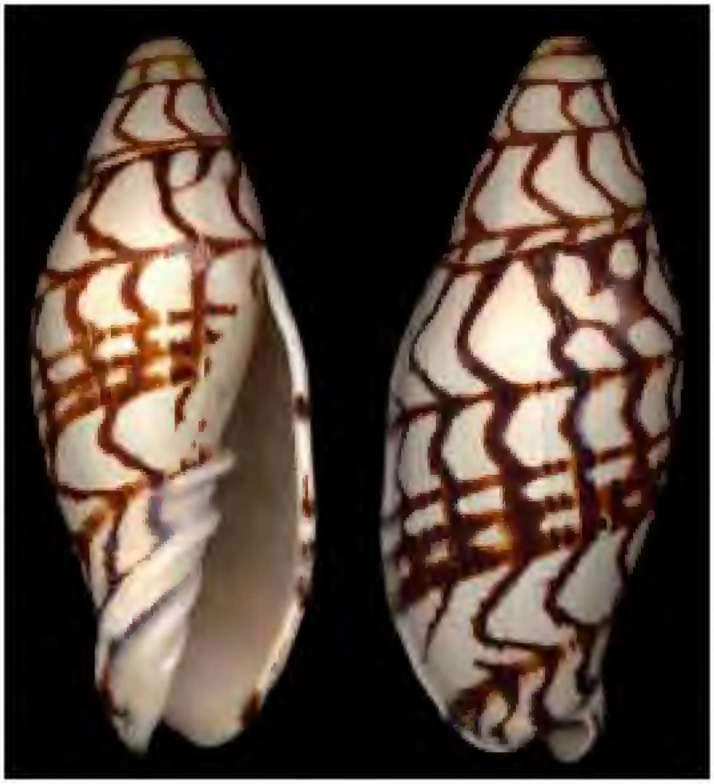
*Taxa listed according to the World Register of Marine Species (WoRMS). The editors of WoRMS use various sources for the Muricidae.



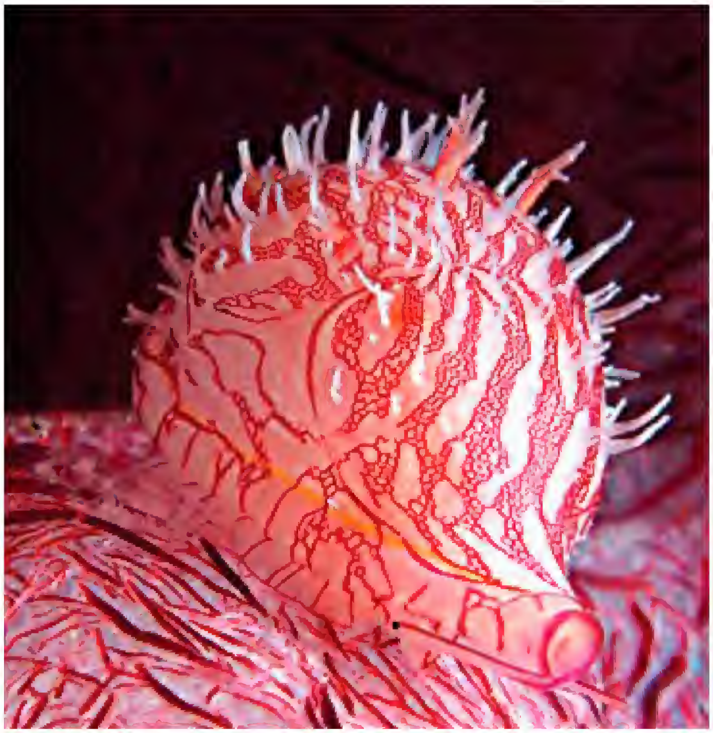
***Metasepia pfefferi*, the flamboyant cuttlefish, photo by the author, 60 feet on sand & rubble slope, Ambon.**



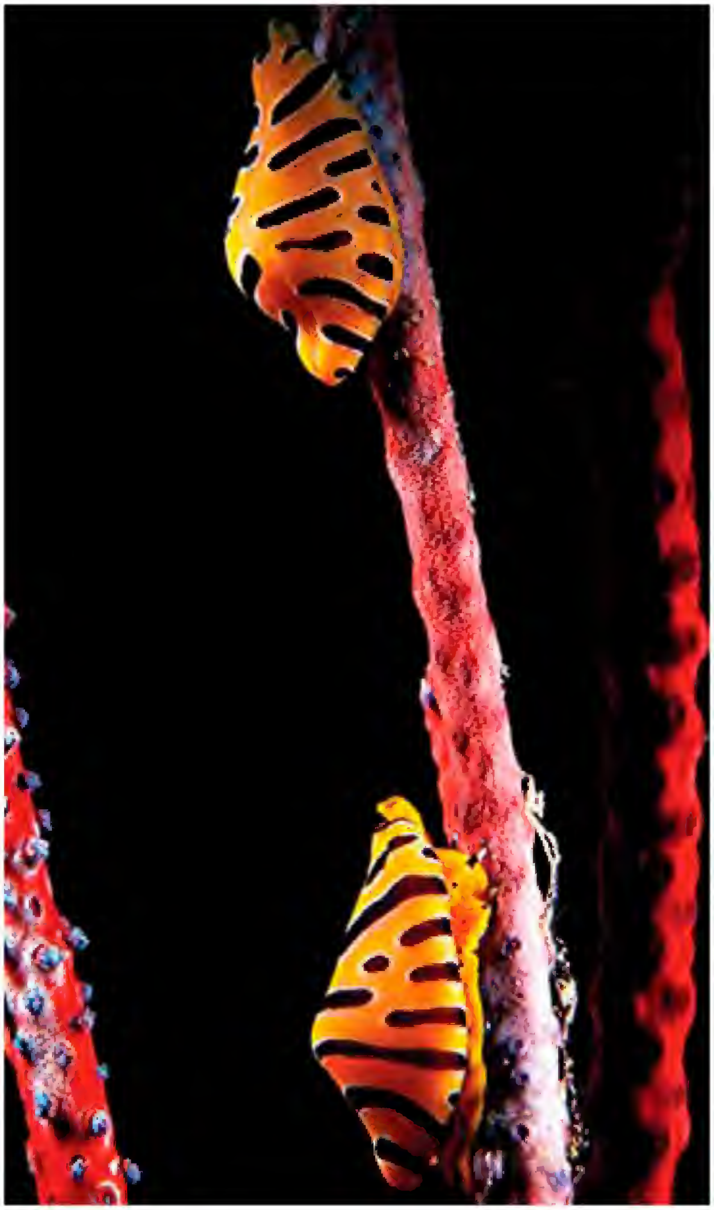
***Calpurnus verrucosus*, the leather coral cowrie, photo by the author, 40 feet on leather coral host, Ambon.**



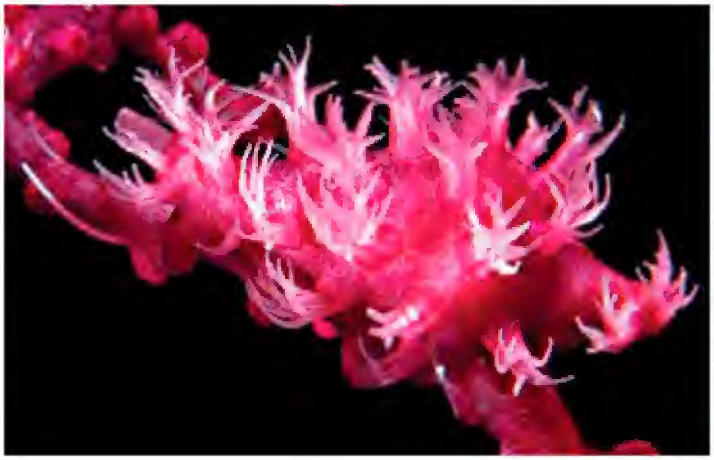
The elusive *Volutoconus bednalli*. This 112 mm specimen was trawled in the southern Maluku Islands, at 40-45 meters, off Tanimbar Island (about 300 miles south of Ambon). Image courtesy of Bill Frank, webmaster, www.jaxshells.org.



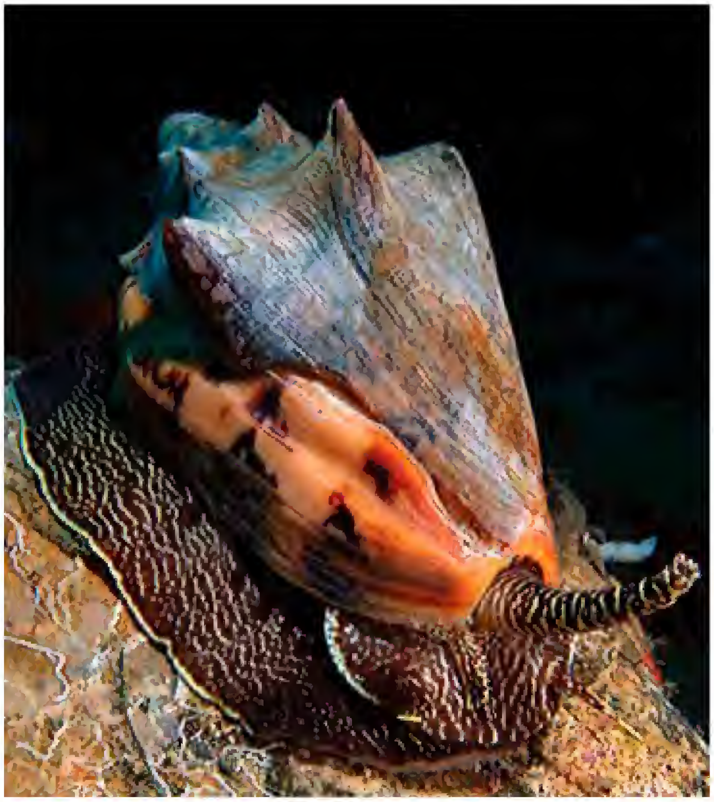
***Serratovolva minabeensis*, photo by the author in 80 feet in a 2 knot current. The animal covers a shell which is approximately 8mm in length.**



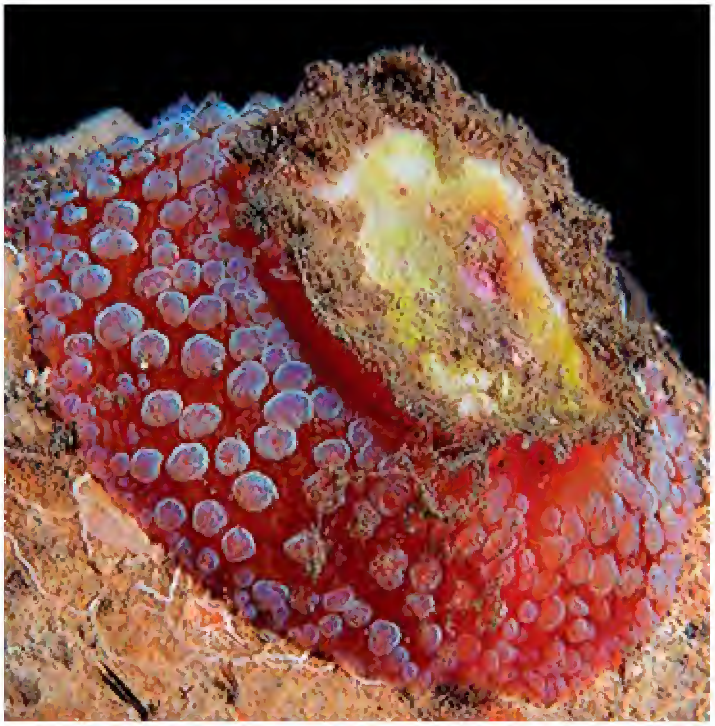
Cuspivolva tigris, 10mm, the tiger ovulid, photographed by the author in 40 feet in a 2 knot current, Ambon.



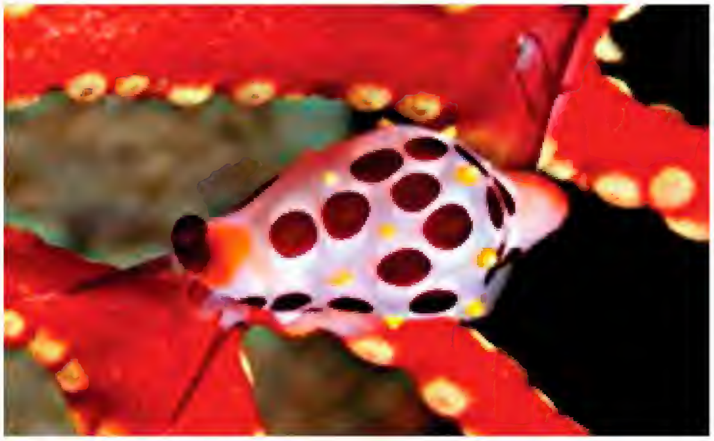
Dentiovula aff. *eizoi*, photographed by the author in 90 feet. This species is approximately 4mm in length.



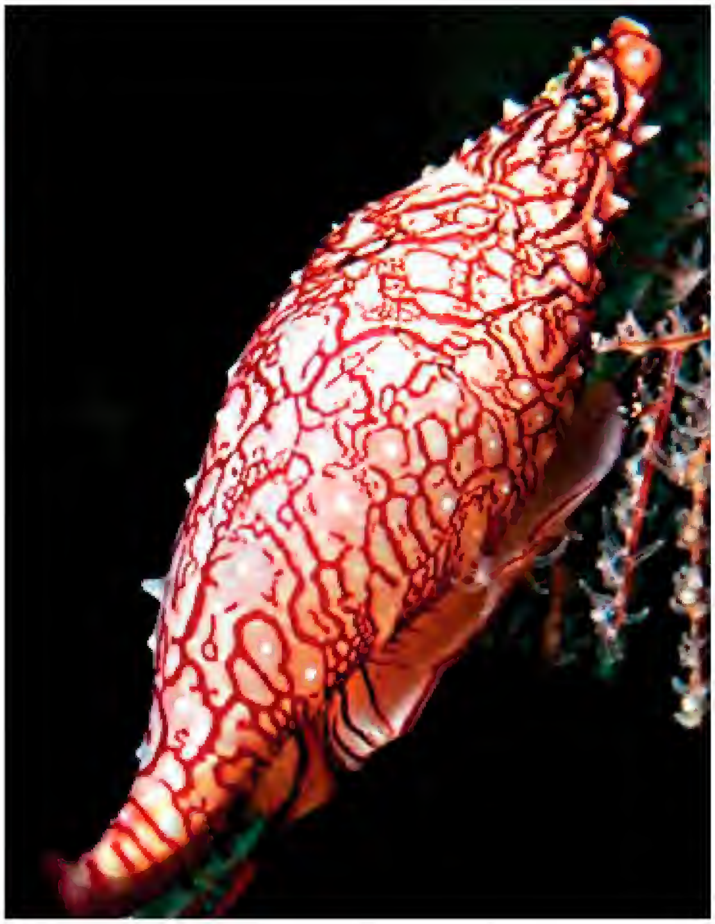
Cymbiola vespertilio, the bat volute, approx 75mm, photographed by the author at night in moderate depth, Ambon. This animal has obviously had a rather serious misadventure, but has obviously made a nice recovery.



Umbraculum umbraculum, approx. 70mm, photographed by the author at night in the same area as the *C. vespertilio* above.



***Primovula* sp., less than 5mm, photographed by the author at night, Ambon.**



***Phenacovolva subreflexa* is the currently accepted name with *P. gracilis* (G.B. Sowerby II in A. Adams & Reeve) now considered a junior synonym. Photographed by the author at night in moderate depth, Ambon.**

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Identifying Florida Glycymerids

Marlo F. Krisberg

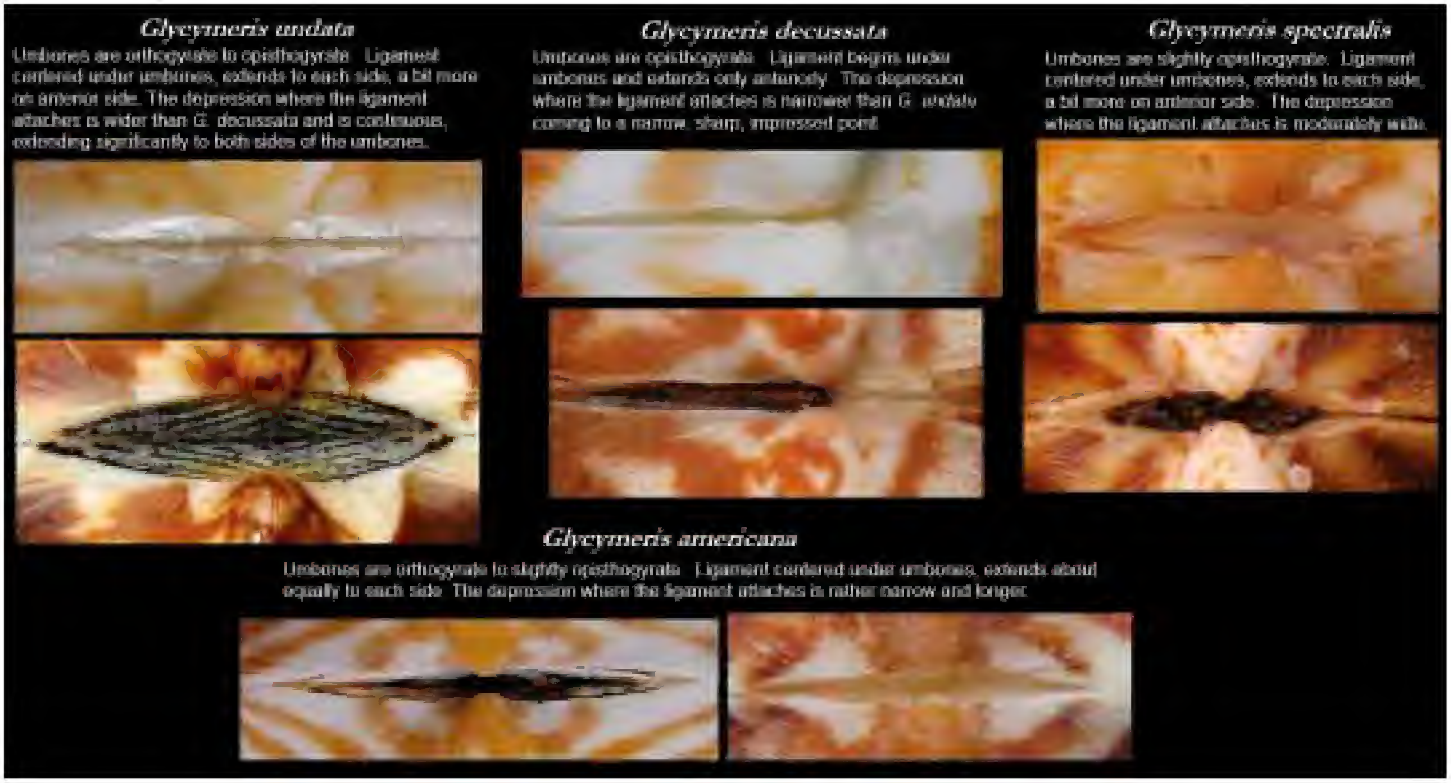
Abbott (*American Seashells* 1974), Mikkelsen & Bieler (*Seashells of Southern Florida - Bivalves* 2008), and Hartmann (*Bivalve Seashells of Florida* 2006) each identified four glycymerids occurring in Florida waters.

Glycymeris americana (DeFrance, 1826)
Glycymeris decussata (Linneaus, 1758)
Glycymeris spectralis Nicol, 1952
Glycymeris undata (Linneaus, 1758)

In reviewing their work, that of others, and my examination of a limited sample for each taxon as to those characters that distinguish among these four, I found that only three characters taken together can be relied upon. All other features were too variable and occurred across all four of these taxa. The one character I relied upon as the first and non-variable feature for separating them was the ligament/ligament depression. The second character was the direction of the curling of the umbones (orthogyrate [curling directly toward each other] or opisthogyrate [curling posteriorly]). Workers have described each of these taxa as having umbones that are orthogyrate or opisthogyrate, however, I found that for the two taxa described as opisthogyrate (*G. decussata* and *G. spectralis*), this was consistently so, but that for the two taxa described as orthogyrate (*G. americana* and *G. undata*), this was not consistently so. Some *G. americana* were slightly opisthogyrate and *G. undata* displayed much variability, sometimes being quite opisthogyrate. The third character was the sculpture of the exterior radial ribbing. While this character was useful, it was also quite variable within a taxon, and often might be indistinguishable from variations within other taxa of this group. This character was greatly influenced by maturity, wear, and also differed on different portions of the shell. It became useful in final confirmation of an identification once the possibilities were narrowed after considering the ligament/ligament depression and curling of the umbones.

A note about the comments by Abbott and Hartmann that the exterior radial ribs of *G. undata* are "separated by lines of white." This condition is frequently present on both *G. undata* and *G. decussata* (and also sometimes *G. americana*) resulting from the darker mottling colors not being present or being very much lighter in the interspaces. This circumstance is well illustrated by Hartmann's photo of *G. undata* and her photo (on the right) of *G. decussata.*

The following comparative guides illustrate the three key characters I've noted.



Glycymeris undata

Umbones are orthogyrate to opisthogyrate. Ligament centered under umbones, extends to each side, a bit more on anterior side. The depression where the ligament attaches is wider than G. decussata and is continuous, extending significantly to both sides of the umbones.

Glycymeris decussata

Umbones are opisthogyrate. Ligament begins under umbones and extends only anteriorly. The depression where the ligament attaches is narrower than G. undata coming to a narrow, sharp, impressed point.

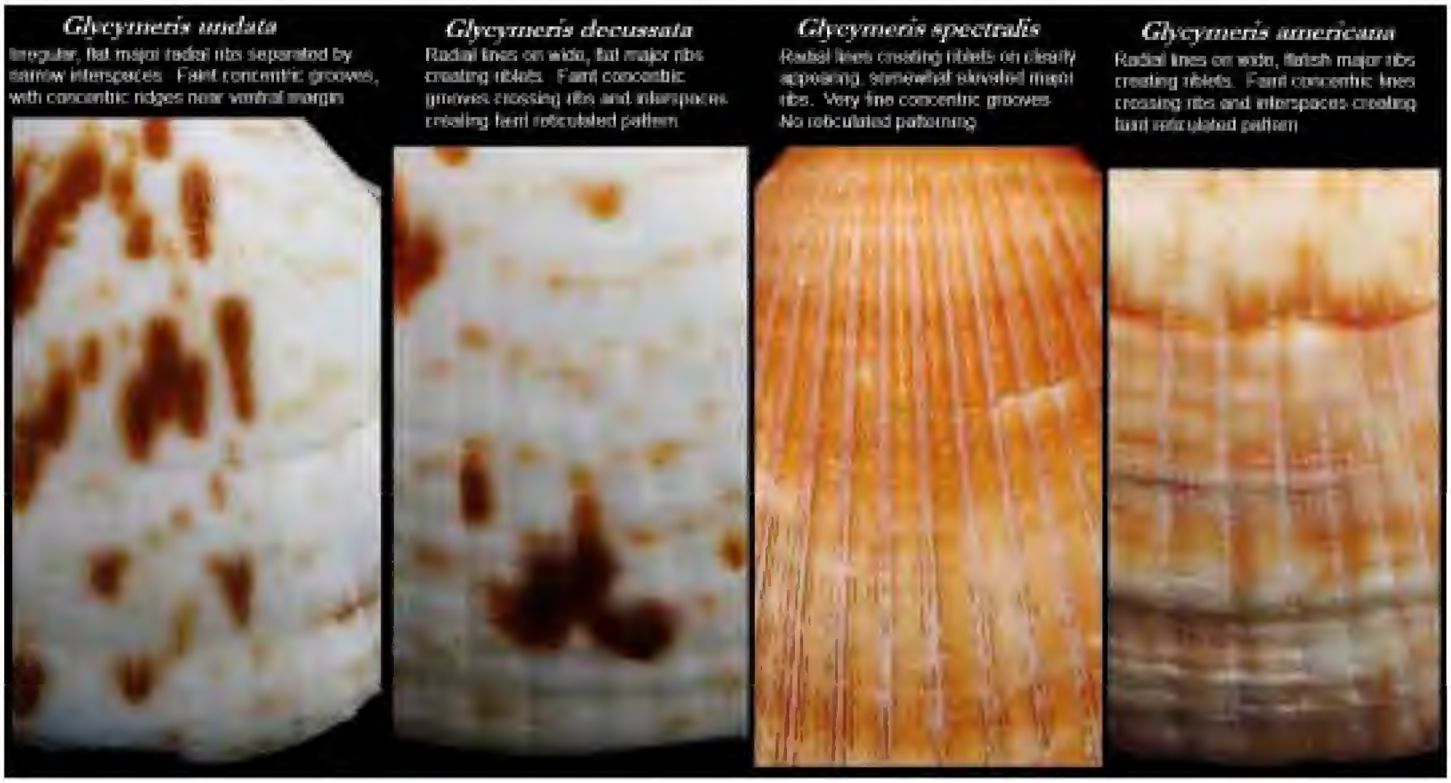
Glycymeris spectralis

Umbones are slightly opisthogyrate. Ligament centered under umbones, extends to each side, a bit more on anterior side. The depression where the ligament attaches is moderately wide.

Glycymeris americana

Umbones are orthogyrate to slightly opisthogyrate. Ligament centered under umbones, extends about equally to each side. The depression where the ligament attaches is rather narrow and longer.

A comparison of the umbone and ligament features of the four species.



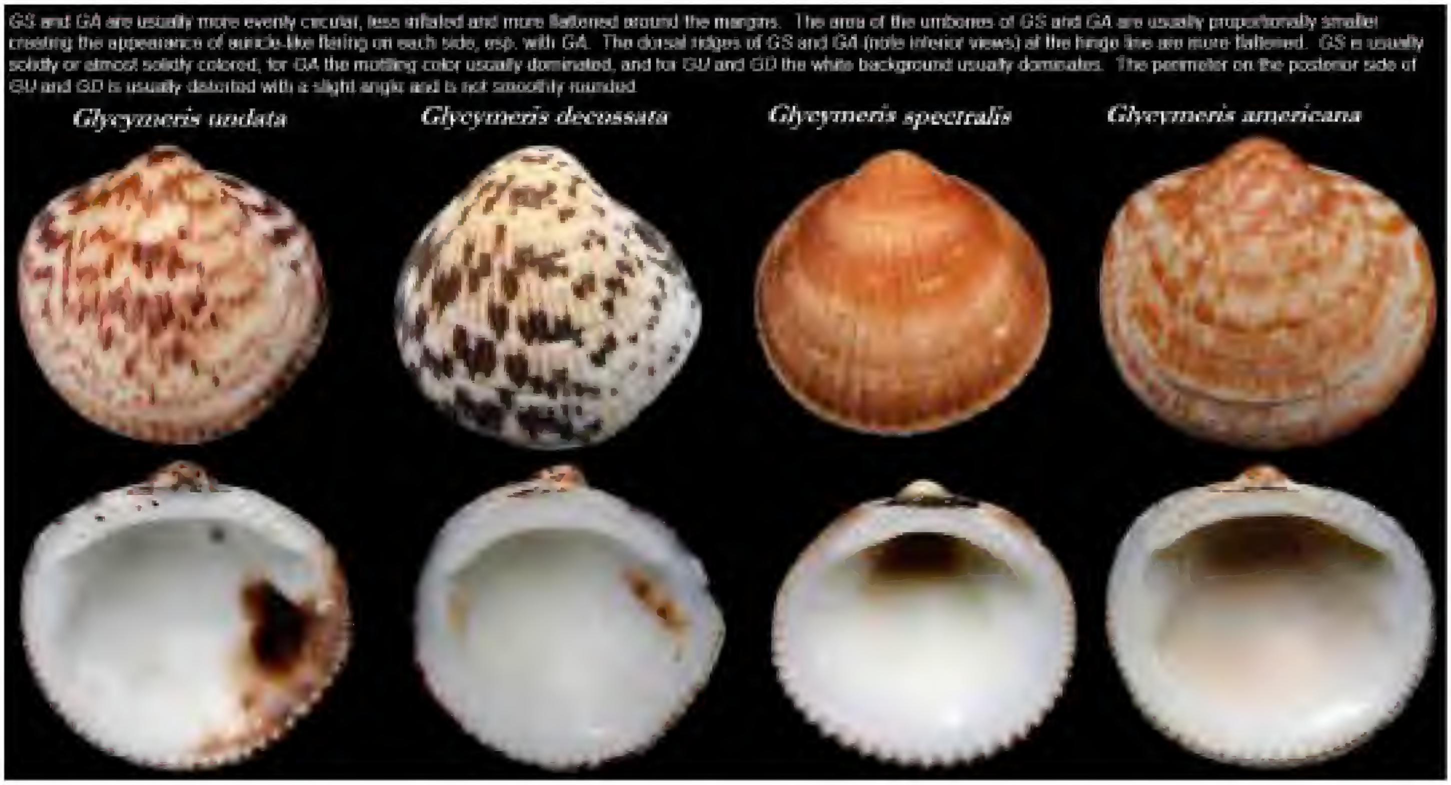
Glycymeris undata
Irregular, flat major radial ribs separated by narrow interspaces. Faint concentric grooves, with concentric ridges near ventral margin

Glycymeris decussata
Radial lines on wide, flat major ribs creating riblets. Faint concentric grooves crossing ribs and interspaces creating faint reticulated pattern

Glycymeris spectralis
Radial lines creating riblets on clearly appearing, somewhat elevated major ribs. Very fine concentric grooves. No reticulated patterning

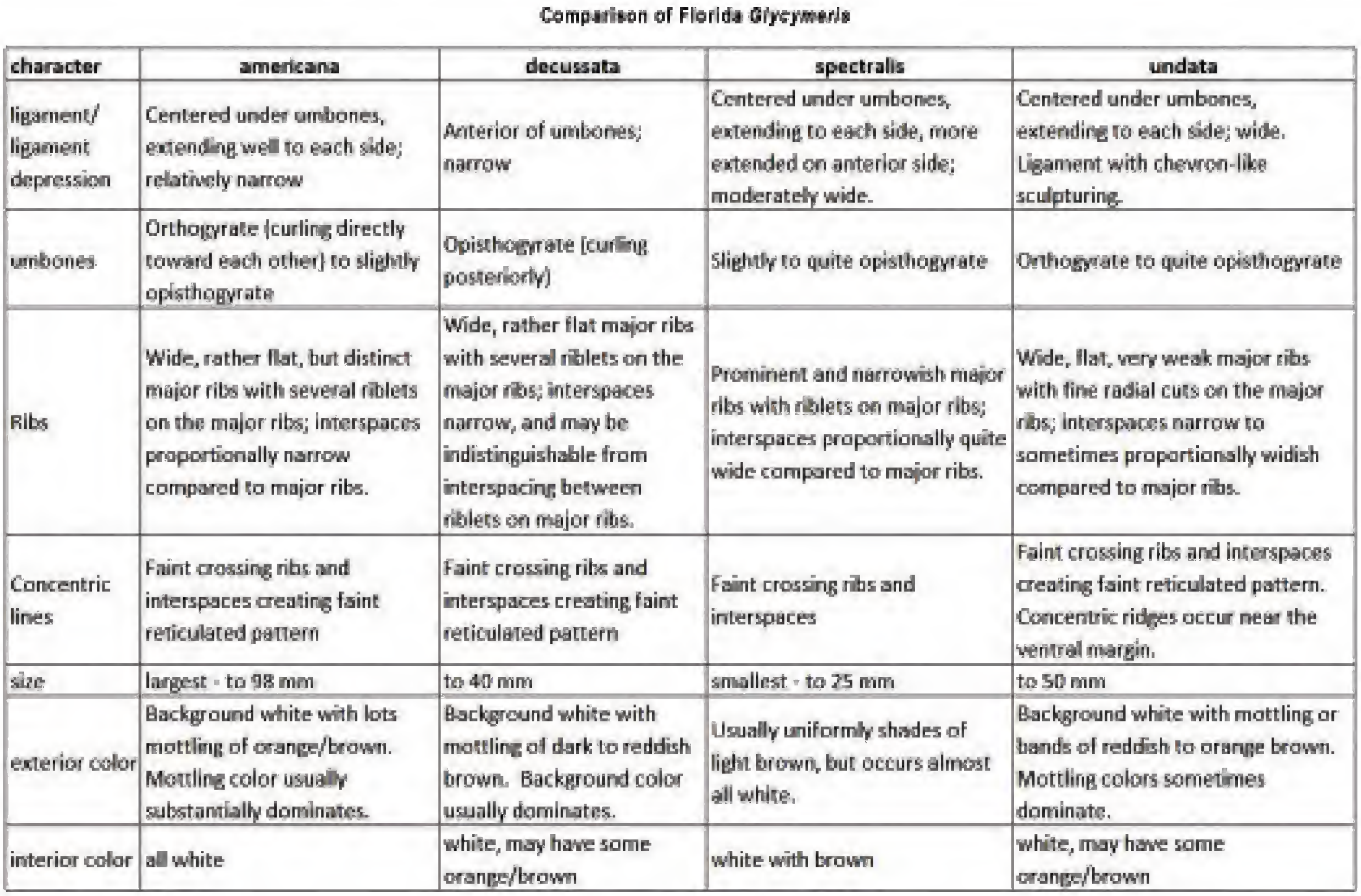
Glycymeris americana
Radial lines on wide, flatish major ribs creating riblets. Faint concentric lines crossing ribs and interspaces creating faint reticulated pattern

A comparison of the sculpture of the exterior radial ribbing of each species.



GS and GA are usually more evenly circular, less inflated and more flattened around the margins. The area of the umbones of GS and GA are usually proportionally smaller creating the appearance of auricle-like flaring on each side, esp. with GA. The dorsal ridges of GS and GA (note interior views) of the hinge line are more flattened. GS is usually solidly or almost solidly colored, for GA the mottling color usually dominated, and for GU and GD the white background usually dominates. The perimeter on the posterior side of GU and GD is usually distorted with a slight angle and is not smoothly rounded.

This plate and the table on the following page provide some visual comparisons and general comments concerning these four glycymerids that can be considered after an identification is made using the three key characters described above. These features, however, are all quite variable and may be present for any single specimen across all four taxa.



Comparison of Florida *Glycymeris*

character	americana	decussata	spectralis	undata
ligament/ ligament depression	Centered under umbones, extending well to each side; relatively narrow	Anterior of umbones; narrow	Centered under umbones, extending to each side, more extended on anterior side; moderately wide.	Centered under umbones, extending to each side; wide. Ligament with chevron-like sculpturing.
umbones	Orthogyrate (curling directly toward each other) to slightly opisthogyrate	Opisthogyrate (curling posteriorly)	Slightly to quite opisthogyrate	Orthogyrate to quite opisthogyrate
Ribs	Wide, rather flat, but distinct major ribs with several riblets on the major ribs; interspaces proportionally narrow compared to major ribs.	Wide, rather flat major ribs with several riblets on the major ribs; interspaces narrow, and may be indistinguishable from interspacing between riblets on major ribs.	Prominent and narrowish major ribs with riblets on major ribs; interspaces proportionally quite wide compared to major ribs.	Wide, flat, very weak major ribs with fine radial cuts on the major ribs; interspaces narrow to sometimes proportionally widish compared to major ribs.
Concentric lines	Faint crossing ribs and interspaces creating faint reticulated pattern	Faint crossing ribs and interspaces creating faint reticulated pattern	Faint crossing ribs and interspaces	Faint crossing ribs and interspaces creating faint reticulated pattern. Concentric ridges occur near the ventral margin.
size	largest - to 98 mm	to 40 mm	smallest - to 25 mm	to 50 mm
exterior color	Background white with lots mottling of orange/brown. Mottling color usually substantially dominates.	Background white with mottling of dark to reddish brown. Background color usually dominates.	Usually uniformly shades of light brown, but occurs almost all white.	Background white with mottling or bands of reddish to orange brown. Mottling colors sometimes dominate.
interior color	all white	white, may have some orange/brown	white with brown	white, may have some orange/brown

Acknowledgements:

Many thanks to José H. Leal, Director of The Bailey-Matthews Shell Museum, and G. Thomas Watters, Curator of Molluscs, The Ohio State University Museum of Biological Diversity, for loan of their collections of glycymerids, and to Dan Teven for providing specimens of the difficult to obtain *G. undata*. And, thanks to those others who reviewed their collections in an attempt to reply to my appeal on Conch-L and provide specimens of *G. undata*.

Abbott, R. Tucker. 1974. *American Seashells; The Marine Mollusca of the Atlantic and Pacific Coasts of North America.* 2nd edition, Van Nostrand Reinhold, New York, pp. 663.

Hartman, Trish. *Bivalve Seashells of Florida.* Anadara Press, Florida, pp. 192.

Mikkelsen Paula M. & Rüdiger Bieler. 2008. *Seashells of Southern Florida: Living Marine Mollusks of the Florida Keys and Adjacent Regions: Bivalves.* Princeton University Press, New Jersey, pp. 496.

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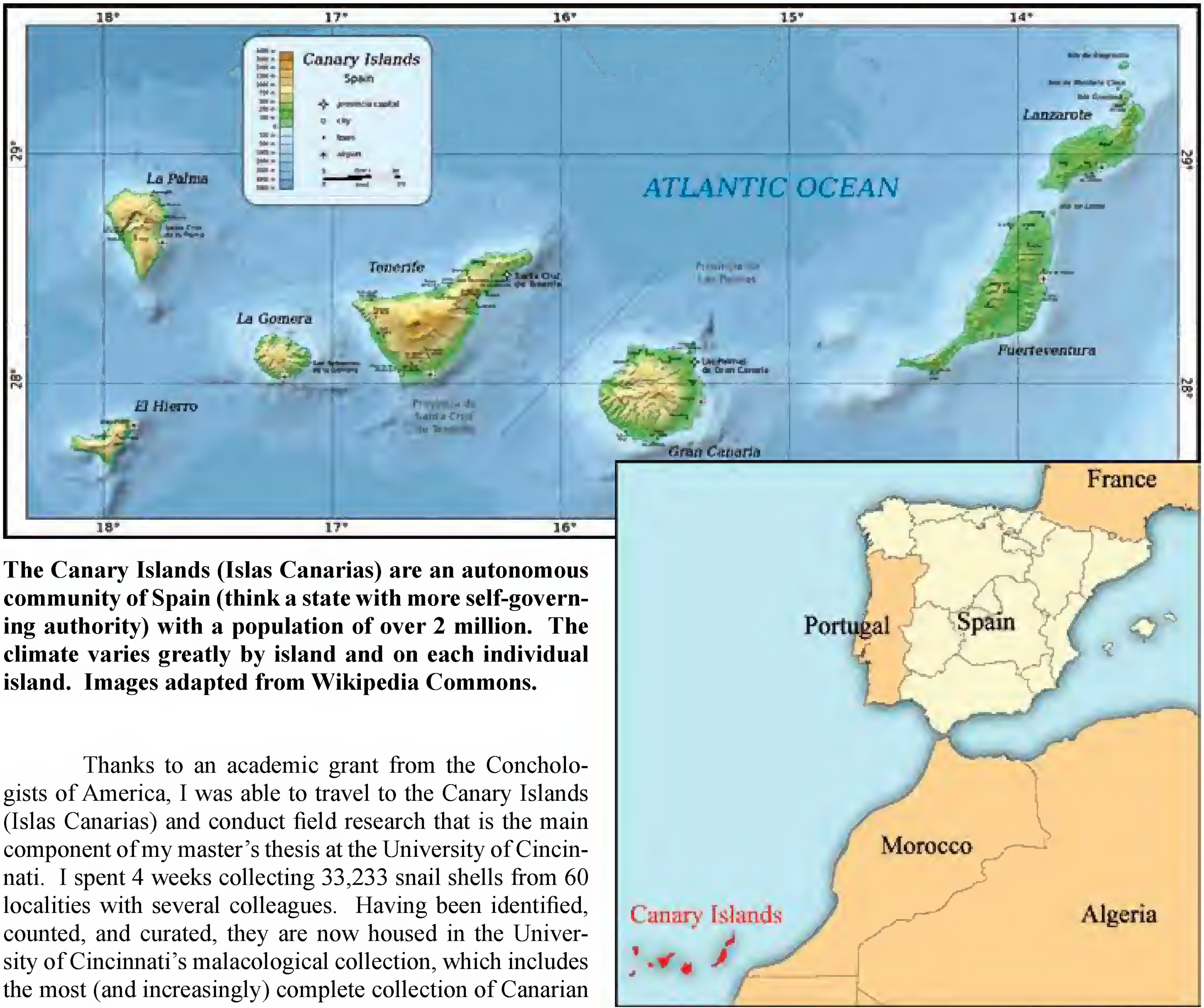
COA grant project in the Canary Islands

Alexander F. Wall



The Canary Islands (Islas Canarias) are an autonomous community of Spain (think a state with more self-governing authority) with a population of over 2 million. The climate varies greatly by island and on each individual island. Images adapted from Wikipedia Commons.

Thanks to an academic grant from the Conchologists of America, I was able to travel to the Canary Islands (Islas Canarias) and conduct field research that is the main component of my master's thesis at the University of Cincinnati. I spent 4 weeks collecting 33,233 snail shells from 60 localities with several colleagues. Having been identified, counted, and curated, they are now housed in the University of Cincinnati's malacological collection, which includes the most (and increasingly) complete collection of Canarian land snails in the world.

I am currently preparing my thesis defense, which will occur in June, and writing an article I expect to be published in a peer-reviewed journal. My project focuses on the way snail community composition changes in response to anthropogenic variables. Samples came from a single biome, the coastal scrub, which roughly rings each island. It is characterized by sclerophyllous vegetation and is semi-arid, temperate, and low altitude. It is also exposed to a wide variety of anthropogenic factors originating with agriculture, industry, urbanization, and recreation, as well as having undisturbed areas.

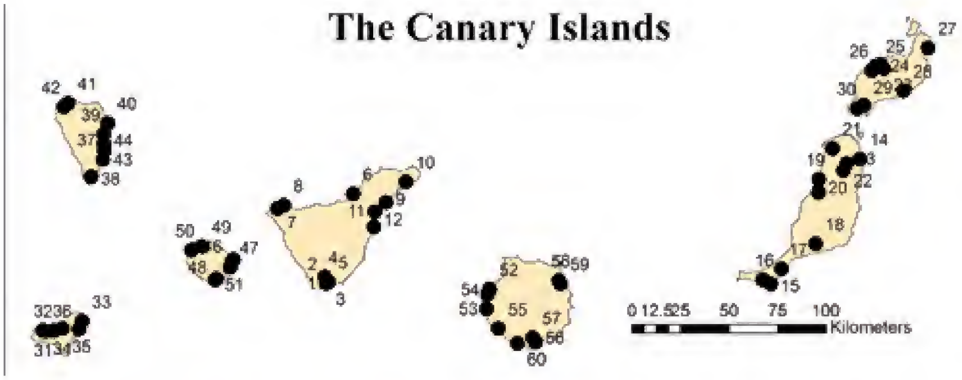
By correlating changes in snail communities to anthropogenic factors, I've been able to detect and quantify apparent human impacts on the Canarian malacofauna in this biome. A clear effect of landscape alteration is a decrease in diversity. Perhaps more importantly, the relationship appears not to be linear, but rather there is a threshold after which the number of species becomes limited. Information like this may be informative, for example, to help conserve the several endangered snail species found in the coastal scrub. I've also found, as others have reported, that human-introduced snails do not seem to be invasive - that is, they don't appear to be expanding their ranges much beyond the areas where they were introduced, but they do tend to be found with cosmopolitan natives, suggesting a homogenization of communities into which they are included.

My lab-mate used thousands of these specimens for her thesis. She is comparing a Pleistocene assemblage

An illustration of the climate variability in the Canaries: 1. is a view of Gran Canaria Island, not tropically lush, but certainly green, 2. is a view of the arid habitat of Fuerteventura Island, and 3. is a view of Mount Teide on Tenerife Island. Images from Wikipedia Commons.

The author searching through a typical sandy arid habitat for shells. Photo by the author.

Shells in the sand. This is definitely not your typical land snail shelling habitat. Photo by the author.



The collecting sites on the various islands. Yes, it was a busy four weeks.

of land snails found on Tenerife to the modern specimens collected on that island. She will also defend this summer and has a publication forthcoming. Hundreds of specimens from the collection have also been used in an undergraduate student project exploring body-size response to climatic variables across multiple islands.

All that is to say, the specimens collected using COA funding have resulted in three projects in less than a year. Data already produced constitutes enough information for at least two further projects and little body-size and no taphonomic data has yet been produced [ed. Taphonomy is the study of decaying organisms over time, including how they may become fossilized]. These specimens have borne significant fruit and I expect will continue to do so for a long time.

Specimens in hand.

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A FUNNY THING HAPPENED ON THE WAY TO A DISPLAY

A couple of years ago, being overly ambitious and woefully under-informed, we decided to do a display of the family Muricidae. Every shell show includes the murexes in the category of "Major Family" and urges the fullest display of the species therein. With over 900 lots of muricidae in our collection how hard could it be?

Really hard! The 900 lots boiled down to about 700 species (OK, I'll admit that 8 of them are unrecognized forms that I just can't make myself give up on). Pretty good, huh? That is until you find reliable estimates of over 1,435 named species. Not so good, we are less than 50%.

Let's do a little math here. Assume you've got all 1,435 and you want to do a display. Most of us have cases that are 24 inches wide and we can get an average of twenty shells to the case. That means you only need 72 cases to do the job, a mere 144 feet of table space (whoops, make that 146 feet to allow space for an award – if you don't get a COA or DuPont for this there is no justice!).

What's that you say? "Don't be ridiculous, nobody would do the display and no show would accept it." But that's exactly the point I'm trying to make. The major families have grown so large over the years that they are undisplayable (I think I just coined a new word).

So my impassioned plea to shell show chairs, rules committees, judges, and other members of the shell show pantheon of gods is to rethink the category of "Major Family". Some families currently included are actually small enough that a reasonable totality can be displayed. Others like Muricidae, Conidae, and Cypraeidae are simply too large. We wound up limiting our display to Muricinae. While I've seen some excellent treatments of minor families in recent shows I've not seen many displays of the major families. Perhaps a category of "A Subfamily of the Major Families" would lead to the reappearance of these long time favorites.

Jim Brunner
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The birth of a trophy

Jim Brunner

THE EASY PART

This started easy enough. "You have a great show but what you need is a special trophy to attract exhibitors." That was all Emilio García had to say to get the wheels turning. Of course all kinds of questions immediately popped up. What will be the criteria for eligibility to win it? For whom or what are you going to name it? What are you going to call it? What is it going to look like?

These were easy questions. It didn't take much of a brainstorming session to determine that we wanted a trophy that could be won by anyone – large collection or small. Very egalitarian of us. A name was a little harder. Names can be chosen based on a level of expertise shown in the display (Masters, Superstar, etc.), an institution (COA, DuPont, Smithsonian, etc.), or to honor those persons who have helped build our hobby (Abbott, Clench, etc.). As all the really cool titles in the first two categories were taken, we turned our attention to those who had done the most to support our club. No contest! Doctors Emily and Harold Vokes had done extensive work in the Florida Panhandle, especially in the area of fossils. After some correspondence with Emily Vokes, we had permission to use their name on our new trophy.

THE HARD PART

That last question: "What should it look like?" proved to be a real struggle. A wooden plaque with text? Too simple. How about a wooden plaque with a gastropod named by Emily and a bivalve named by Harold mounted on it? When you add the text that's going to be a huge trophy. So how about just one shell that is named for the two of them. "Emilio, does such a creature exist?"

"Yes: *Siratus vokesorum* García, 1999."

Emily: "Oh that would be wonderful".

Well, that was easy. I should have known better. The next question to Emilio: "Do you know of any dealers who might have these in stock?" Answer: "Well, there are only **two** known specimens – one in a private collection in the Bahamas and the type at the Academy of Natural Sciences in Philadelphia." My day is not going well – not well at all. Emilio: "But I did take pictures of the type. I can send you those."

A tiny ray of sunshine. Pictures in hand (actually on a thumb drive), it was off to the local trophy shops to see if they could create a decal that could be mounted on an acrylic trophy. Five shops available and naturally it was only the last one that said they *might* be able to do it. Days pass. "No, the pictures are not of high enough resolution." Rats! Where, oh where am I going to get better pictures? Wait, the type is in Philly at Drexel. I know people there, maybe they can take pictures.

Do you know how hard it is to grovel in an email? But my heartfelt (and increasingly desperate) plea fell upon the sympathetic ears of Paul Callomon, a scholar and gentleman of the highest order. Soon my thumb drive was much heavier with the addition of four more photos. Off to my decal guy – but gloom and despair yet again, the answer was the same. Still not enough resolution.

Sometimes, no matter how hard you plan, it is just sheer dumb luck that saves your bacon. Our frying pan this time was the annual Broward Shell Show and the bacon saver was the elegant acrylic trophies that they award. They have found a craftsman who is able to carve their club logo shell into the reverse side of the trophy, giving a three-dimensional quality to the image. Broward's Bob Pace, another scholar and gentleman of the highest order, provided a name, number, and email.

THE CREATION: A TIME LINE

(Shell Show 17-19 June)

January: Photos sent. "Looks pretty tricky but I'll give it a try".

February: Nothing. But then he's just getting started.

March: Nothing. But there's still plenty of time.

April: Nothing. Maybe I should call him?!? "I'm waiting on my etcher." Etcher, what's an etcher?

May: Nothing. Linda: "You seem to be getting a lot more gray hair. Call him." "Oh, yes. They're finished, have been for a couple of weeks."

June: 10 June. Trophies arrive (yes, trophies). We ordered five. We don't know how old the carver is.

June: June 18. And the winner is……Vicky Wall of North Carolina. She receives Trophy Number 2. Trophy Number 1, fittingly, was presented to Dr. Emily Vokes.

Would you like to win this trophy? Our next Gulf Coast Shell Show will be on 9-11 June 2017 in Panama City Beach. The exhibit criteria for eligibility to win the trophy are:

The Vokes Trophy: Awarded to the best display, in the opinion of the judges, presenting a fairly balanced presentation of various families of gastropods and bivalves. Other classes may be included but should play a minor role. The display may be worldwide, regional, or from a local area and may include recent shells, fossil shells, or a combination of both. This trophy honors the work of Drs. Emily and Harold Vokes.

After the first show it was concluded that "fairly balanced" would mean that approximately ten percent or more of the shells in the display should be bivalves.

New trophy? Piece of cake!

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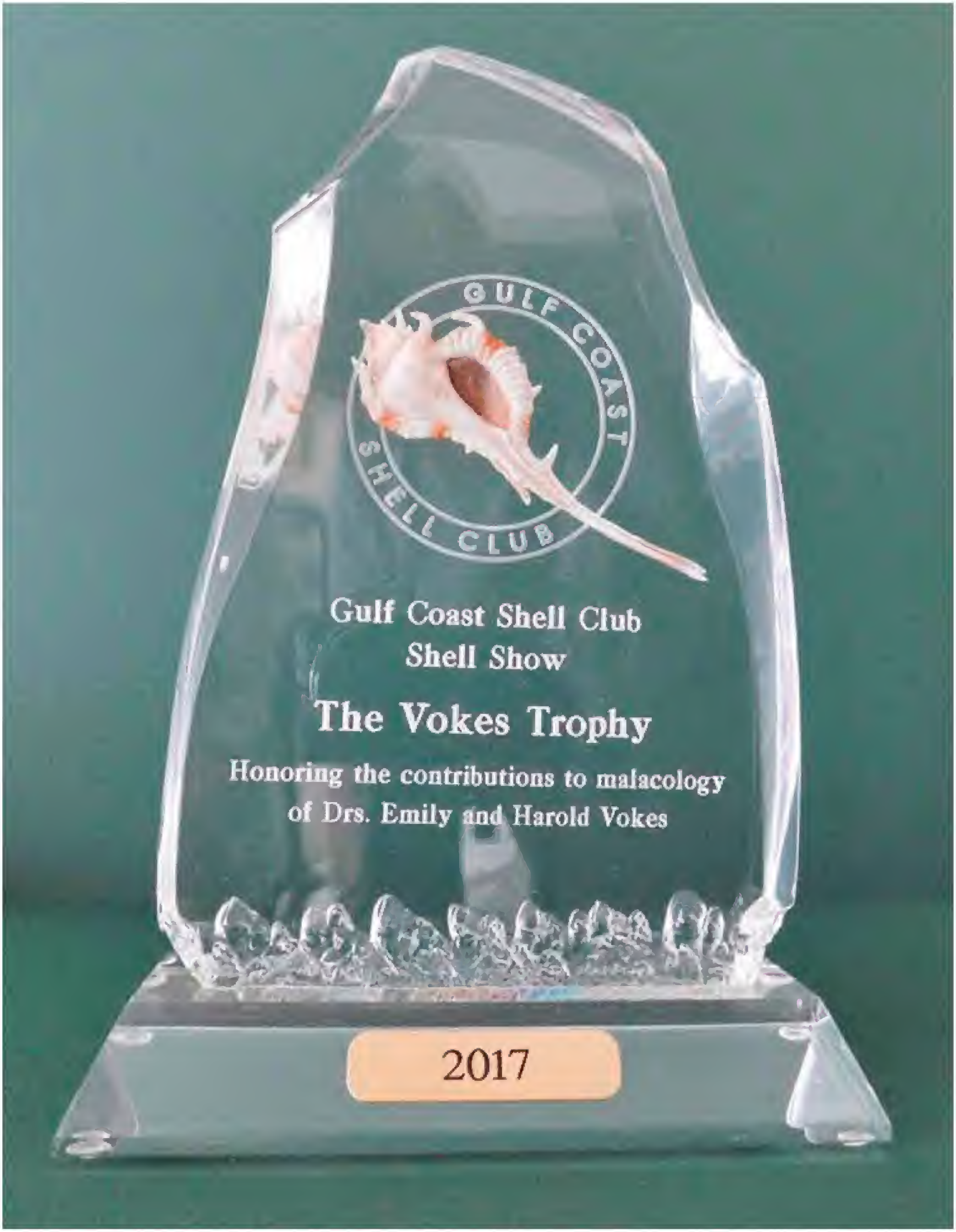
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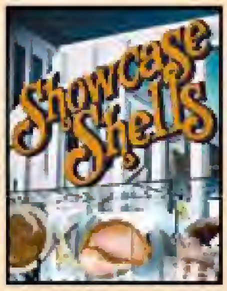

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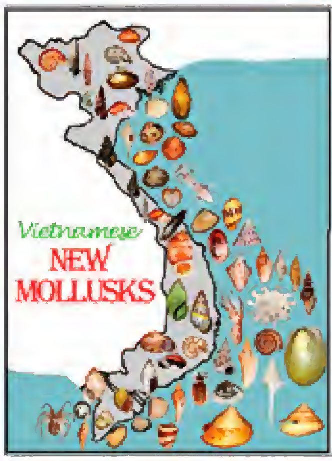

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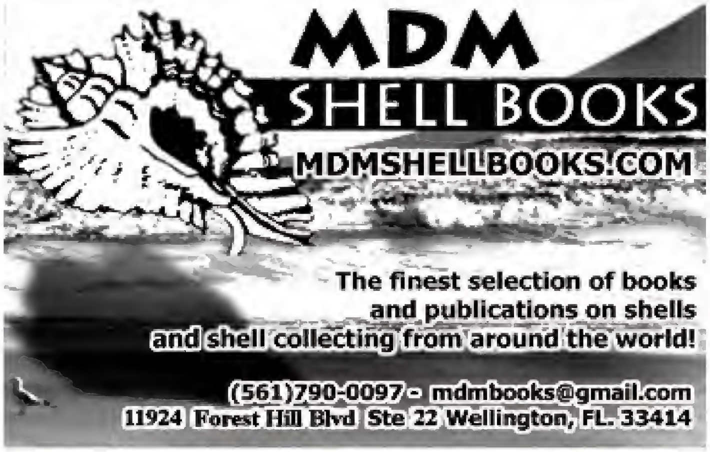

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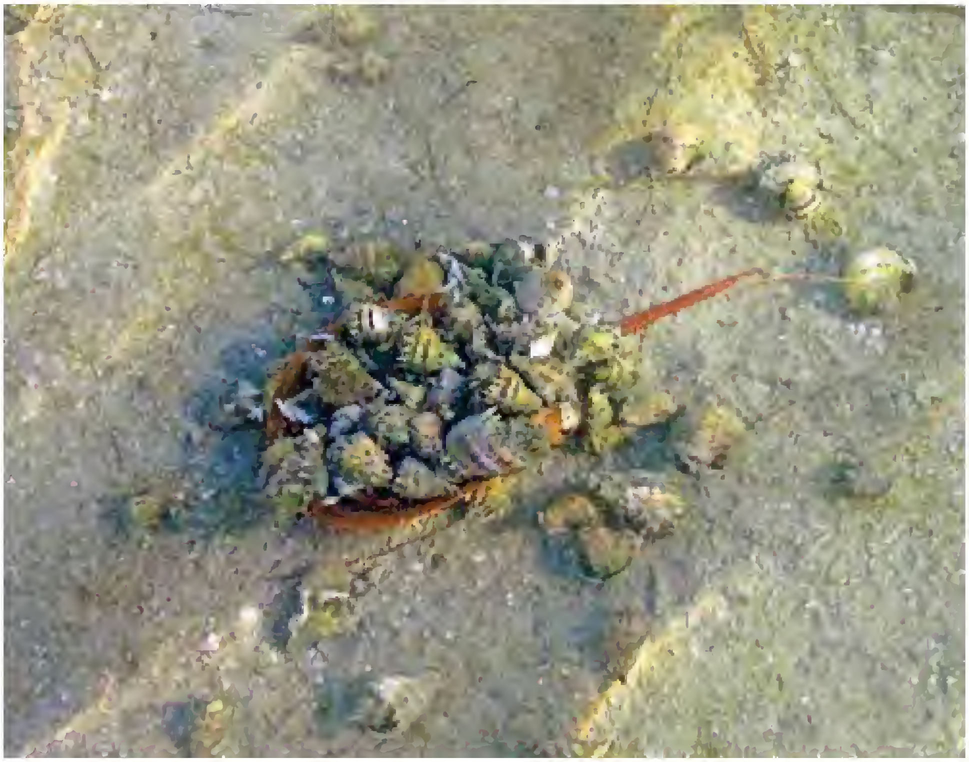
Crown conch royal buffet

Lisa Fitzgerald



What a sight! One fine winter day last January, my sisters, Sunnye Dinger and Suzanne Bobo, and I had just hopped out of Captain Brian Holaway's boat into 3-foot water on the Pine Island Sound side of Cayo Costa Island, Florida, headed for some serious shelling. The tide was too high to get all the way to shore in the boat so we were walking the last bit in the water. Seeing something dark on the bottom up ahead, we edged closer. It was a deceased horseshoe crab, *Limulus polyphemus* (Linnaeus, 1758), being consumed as if it was a grand buffet! Dozens and dozens of crown conch, *Melongena corona* (Gmelin, 1791), of all sizes were fighting for a spot at the table. A look around found them migrating toward the crab in droves.

Once back home, a little research on these hungry conchs was in order. The Smithsonian Marine Station at Fort Pierce online site relates that, "*Melongena corona* is a tropical to subtropical species occurring on both coasts of the Florida peninsula, eastern Alabama, and throughout much of the West Indies south to South America." It later states, "*Melongena corona* is an opportunistic predator/scavenger capable of feeding on a variety of live prey items as well as carrion and detrital material." That explains the frenzy surrounding the dead crab!

About the many named forms, the site states, "Highly variable coloration, size, and shell architecture, and the physical discontinuity of habitat in which *Melongena* is found have led to considerable taxonomic debate as to the designation of distinct species and subspecies. Historically, a number of putative *Melongena* species and *M. corona* subspecies have been collectively been referred to as the "corona complex." Recent DNA sequence analysis conducted by Hayes & Karl (2004), however, provided no support for historic taxonomic subdesignations and indicated that the corona complex consists of the single polymorphic species *M. corona*."

With interest I read that, "Kaplan (1988) indicates that *Melongena corona* can attain lengths of greater than 200 mm, but most individuals are considerably smaller." Further on it states, "Cannibalism has also been suggested as a strategy for achieving large size."

Cannibalism? Gordon Gunter in his 1956 journal article stated: "The crown conch is certainly one of the most active and aggressive of the predaceous snails, and the smaller specimens of its own species are not spared when no other food is available." Who knew?!

The horseshoe crab feast was definitely a treat to observe. No doubt, however, it will be difficult to ever look at a Crown Conch in quite the same way.

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Smithsonian Marine Station at Fort Pierce. 2016. http://www.sms.si.edu/IRLSpec/Melongena_corona.htm

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"Got the fever" in the Dominican Republic

Dora Zimmerman (photos by the author)

In May 2015, I found myself in a pool in Southern Maryland with the lifeguards staring at my unusual appearance, probably chuckling to themselves. I was in full snorkel gear swimming back and forth down the lap lanes, learning to snorkel. I was going on a trip! I showed up at this pool four times a week for two hours doing the same routine for the entire month of May. Never having snorkeled before, but being a good swimmer, it was still important to be prepared for my first collecting/snorkeling trip.

Fifteen members of the North Carolina Shell Club went to the Dominican Republic, June 11-19, 2015, on a shelling excursion. This trip was announced a year before to club members. Many of our members had been on trips before with our guide, Glenn Duffy, and everyone knew this would be another quality trip. I had never been on any out-of-country trips and there was so much to do! Thankfully Glenn sent out a recommended packing list of what to prepare for this trip. Once 2015 hit there were trips to the dive shop, visits to my optometrist, prescription goggles ordered, deposits sent in, traveler's insurance obtained, equipment purchased and ordered, luggage purchased, currency exchanged, and practice snorkeling. "I'm ready!"

All 15 club members arrived, Wednesday, June 10, 2015, in Fort Lauderdale, Florida, and after meeting for dinner, were given instructions by our trip organizer, Everett Long, about our departure schedule the next day. No need for real alarm clocks, Everett would call everyone at 3:30 am to be up and ready for our shuttle by 4:15 to the airport, awaiting our 6:30 am flight. Coffee, fruit and Danish were all waiting at the airport for our tired but eager group. Navigating through any airport, for me, is foreign, as I am not a traveler. It was with gritted teeth and wringing hands that I made it all by myself to Fort Lauderdale from BWI Airport in Maryland. I was so happy to give it over to my fellow travelers. I felt like a baby elephant following the herd. Just lead, I will follow. NOW I could relax. Or so I thought…

CULTURE SHOCK!

We landed in the Dominican Republic by 12:00 noon in Santo Domingo and were promptly met by our guides for the trip, Glenn Duffy and his partner, Randy Hooks. Our destination was Las Salinas, located in the province of Peravia, the southwest region of the Dominican Republic. We endured a nail-biting, "take your life in your hands" drive, according to David Bunn, through the downtown streets of Santo Domingo as we headed out of the city. I don't know how many times I gasped in surprise each time I saw someone's life flash before their eyes zipping through this traffic.

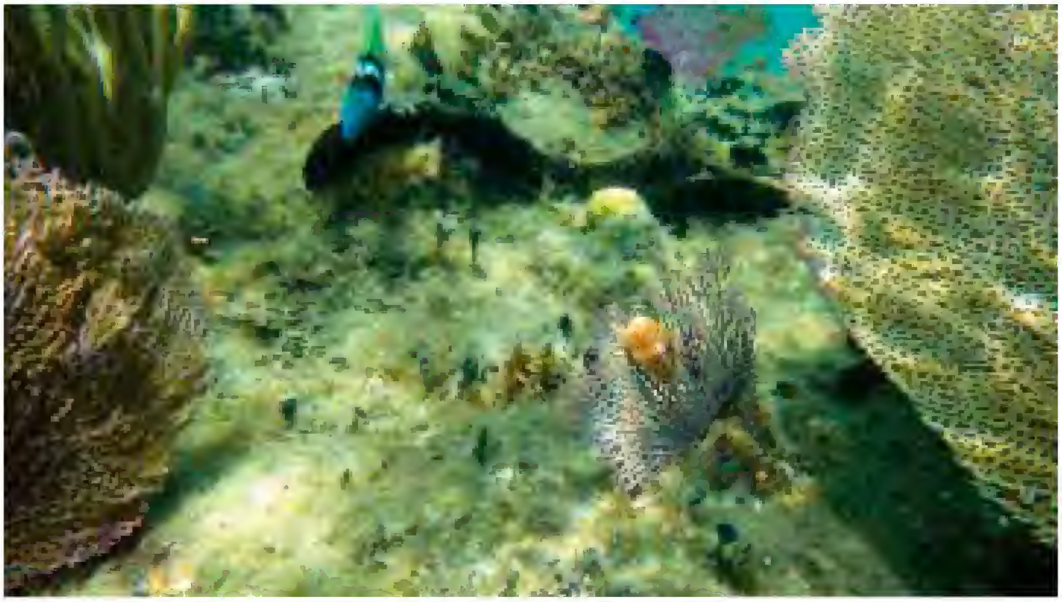
Preparing for my first snorkeling shell-collecting trip. Next stop, the waters of the Dominican Republic.

Turns out the next stop was a traffic jam. What is missing from this photo is the cacophony of horns from vehicles going nowhere and raucous exhaust sounds of motorcycles as they zipped in between larger vehicles.

The cacophony of horns from the crowded vehicles jammed on the streets and the buzz of just as many motorcycles darting in and out between vehicles were "music to the ears," depending on how one looks at it. I live in a rural town in Southern Maryland where I see Amish horse and buggies on the road all the time and the only noise I get from them is the clip clop of horse hooves. Street vendors walked right up to our shuttle vehicle, in between the rushing vehicles around us, selling wares such as birds in their cages, loofa, mangos

The Junta Central Electoral (Central Election Board) was established in 1923 to oversee elections and other facets of civil life in the Dominican Republic. It is also issues birth certificates and identity cards.

Our 12 passenger van that was able to accommodate 17 passengers plus snorkel gear. A bit of a tight fit, but it was certainly worth it to have reliable transportation for the entire group.



My first day in the water and a magical world unfolds: waving sea fans, a male blue-headed wrasse (*Thalassoma bifasciatum* (Bloch, 1791), the females and immature males are yellow and white), and a flamingo tongue (*Cyphoma gibbosum*).

and other fruits and nuts, windshield wipers, and seat cushions.

Some of the sights we enjoyed during our drive consisted of the Plaza de la Bandera, the Dominican Republic's version of our country's Tomb of the Unknown Soldier, in Washington DC. We saw small crowded homes built into steep hillsides and along the roadways there were single-level ramblers right next door to even larger, more expensive homes. The larger homes had tall walls made of metal gates, or cement surrounding them due to the fact that squatters will take over once a house is being built. Homeowners put these walls up to keep squatters out because once they take over the property, it is difficult to get them off. Glimpses of trees, the royal poinciana (*Delonix regia*), in bright orange bloom and wandering goats were seen throughout our drive. With a quick stop at a local roadside shop, we stocked up on locally grown cashews, mangos, drinks and other treats as we continued to our hotel, the Hotel Salinas, located the bay, Bahia de Las Calderas, arriving around 3:00 pm.

Our hotel hosts, Jorge and Bernice Domenech, checked us in. Before evening set in, members took off to find the local Colmados store to get supplies, such as buckets and bleach. "Colmados" means "full to the brim" in Spanish and equates to the US's version of 7-11 stores. We were told that we would enjoy delicious meals with fresh seafood and fruits daily while sitting in the dining area that was wide open to the breezes of the bay. Strawberry jam from Knott's Berry Farm in California, was an unexpected sight sitting on our tables during breakfast each morning. The instructions given at dinner by Glenn and our club president, Everett Long, left everybody excited to begin our adventure.

FRIDAY, our first day, we will snorkel off the beaches of Playa de Salinas. Breakfast finished and everybody packed up for the morning trip by 7:30 ready to go. Glenn commandeered the hotel van for us to use during the week. This van, originally intended to fit 12 people, squeezed 17 people in PLUS snorkel gear every day.

THIS IS NEW TO ME!

I watched everybody get out of the van like the seasoned snorkelers they were. While I'm in the process of getting my gear on I noticed, very quickly, that I was all alone! "Where did everyone go?" "Geez, they're all in the water already!" I stood there looking at what's lying in front of me waiting for me to maneuver across to deeper water, endless beds of black sea urchins on shallow exposed flat reefs! "I'm supposed to get over *THAT*!?"

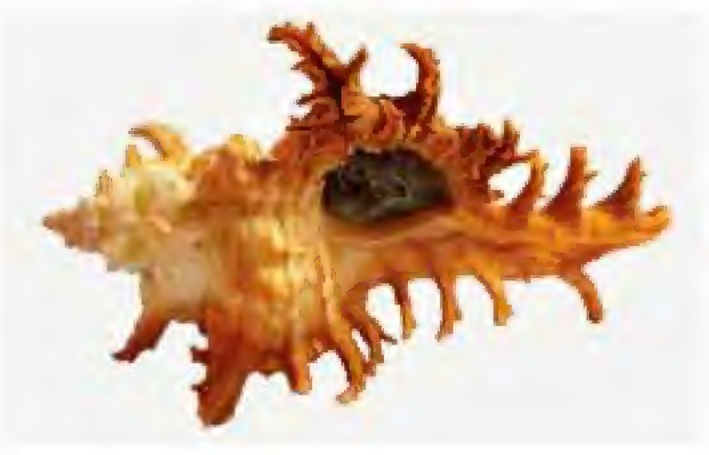
Everybody had their own version of shuffle and scoot and I realized that there was no graceful way to make your way over this "bed of horrors" to get to deeper water. I suppose I looked like I was walking on hot coals during my crossing but I made it.

Once past that shallow obstacle, I put on my mask and found a world of soft, flowing, clear beauty. Masses of bright purple sea fans, gently swaying in the current made it feel like another world! I had never seen this world before! Sometimes I found myself not worrying about searching for shells, I just floated and watched this underwater world and took in all its wonder and beauty.

Collecting environments along the Playa de Salinas area consisted of beach, shallow water, coral reefs, rubble, smooth sandy bottoms, and turtle grass beds. Earlier, Glenn suggested that as we explore the base of reefs and sandy rubble, we "fan" with our hands to uncover mollusks and shells hidden in the rubble. Our search was on for the Atlantic carrier shell, *Xenophora conchyliophora*, known in this part of Dominican Republic to carry black pebbles. "Look for sandy mounds about the size of your hand." Glenn said. I was fortunate to find two my first day, doing exactly as Glenn instructed. Other species gathered our first day were amber pen shells (*Pinna carnea*), Barbados keyhole limpets (*Fissurella barbadensis*), deltoid rock shells (*Vasula deltoidea*), Caribbean spiny limas (*Lima lima*), apple murexes (*Phyllonotus pomum*), speckled tellins (*Tellinella listeria*), carrot cones (*Conus daucus*), milk conchs (*Lobatus costatus*), hawk-wing conchs (*Lobatus raninus*), zig zag scallops (*Euvola ziczac*), and eastern turret shells (*Turritella exoleta*).

Ed Shuller showed us the live, rare-for-this-area, pink or spectral murex (*Chicoreus spectrum*) that he found in 5-6 feet of water on a flat rock shelf at the bottom of the sandy trench. "I almost threw it back because it was totally covered with a white crust and I didn't think it would clean up very well." Looking at this beauty, I'm certain Ed is glad he didn't toss it.

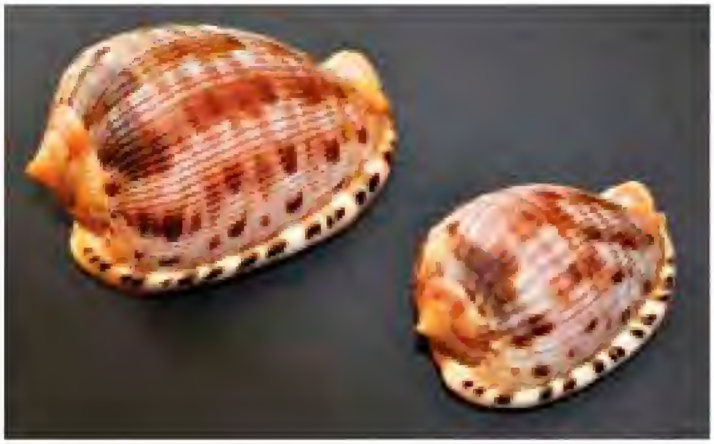
SATURDAY saw us on a path through the local salt flats to get to a different stretch of beach. The sun bakes all the moisture right out of the dirt and leaves a salty crust behind over which we crunched with every step we took on the path. We stopped and watched the salt operations as Haitians, who are trucked in every morning, do endless hours of tiring, hot, backbreaking work to rake up the salt from the wet salt ponds, scoop it into wheel barrows, dump it into piles, shovel it into bags, and load it on trucks. The pinker the salt, the closer it is to being ready for harvesting. After additional processing elsewhere in the country, it is then used for table salt and ingredients in packaged foods. Susan Rotman went over to a pile and grabbed a handful of it as a souvenir. She decided not to consume it once she got back in the states, but her family enjoyed seeing the freshly harvested salt that came directly from the flats of Las Salinas.



A beautiful example of *Chicoreus spectrum* collected by Ed Shuller. When collected it was heavily encrusted, but it cleaned up nicely.

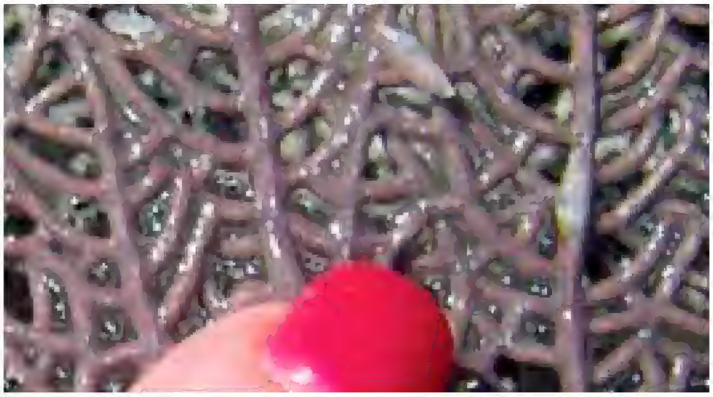
Workers harvesting salt from the salt flats.

On this particular part of Las Salinas beach we viewed the mountains across Bahia de Las Calderas as they rose in the distance across blue waters. This area was farther south along the Las Salinas beaches and some of our group reported numerous colonies of the purple sea fan (*Georgia ventalina* (Linnaeus, 1758)) swaying with many flamingo tongues (*Cyphoma gibbosum*) attached. Everett Long showed everyone the two reticulated cowry helmets (*Cypraecassis testiculus*) he was fortunate enough to find by chance after he came out of the water. "I was taking my time walking back to the group along the water's edge when I saw the large one almost out of the sand. Upon closer inspection



Two near perfect specimens of *Cypraecassis testiculus* collected by Everett Long. Although considered a shallow-water species, they have been taken at over 100 meters.

The two pistol or snapping shrimp that were in a shell collected by Glenn Duffy. Although quite small, they were able to express a bit of "attitude" against his finger.



Two West Indian Simnias on their sea fan home. Their cryptic coloring makes them quite difficult to spot.

I saw the top of the smaller one beginning to appear." Right time, right place!

Hazel Andress and I were lured by the beach while everyone else snorkeled. Strolling along, we found lamellose wentletraps (*Gyroscala lamellosa*) and Atlantic gray cowries (*Luria cinerea*) tangled in the high tide lines and six West Indian simnias (*Cymbovula acicularis*), attached to a broken piece of purple sea fan washed up in the shallows.

We rested and spent a few moments lying down on our backs on the wet sand, with the water lapping at our toes while we gazed at the blue skies and beautiful scenery. We laid there and giggled like school girls at the fun of it – like we were getting away with something! What a special day.

Some of us would gather on the beach after coming out of the water to see what we found. Glenn and Randy usually dumped their bags out for all to see. Surprising visitors to our shell world were two pistol or snapping shrimp (family Alpheidae) that had their home inside of one of the shells Glenn collected. They were disturbed, to say the least, and one took a little bite out of Glenn's finger hard enough to draw blood. Small but mighty!

We had a long, hot walk back over the crunchy salt pond trail, which lead Glenn to get the brilliant idea to stop at the Colmados on the ride back for a cold beer for anyone who wanted one. The local store owner must know Glenn from previous tours, so he started pulling plastic chairs out and setting them up on the sidewalk for all to sit on as we bought our cold drinks. Our skin suits and boots were crusted with dry salt and sand, we were dirty and probably smelly, but there was nothing like it. That cold beer, Presidente, was the best beer we ever had! An exceptional way to end a good day!

SUNDAY was a day of change in location. Dominicans from the metropolitan area of Santo Domingo are known to come to the Playa de Salinas beaches as a weekend getaway. Glenn arranged for two local boaters to take us across the Bahia de Las Calderas bay to an area named Palmar de Ocoa, for some un-interrupted snorkeling opportunities. We had to wade through the sticky mud bottom to get to shore when we landed. This area had quite a variety of collecting environments compared to the beaches at Playa de Salinas. Rocky shorelines, sandy and muddy beachlines, shallow sand and turtle grass floors, mangroves, rocky and coral reefs, were all there waiting for us. I was looking along the shore and didn't realize what I was walking on until Vicky Wall pointed out the many West Indian false ceriths, *Lampanella minimas*, clustered along the muddy water's edge. An Atlantic morum, *Morum oniscus*, and an Atlantic partridge tun, *Tonna pennata*, were found washed up among the rocks on shore. Bleeding tooth, *Nerita peloronta*, and four-toothed nerites, *Nerita versicolor*, were attached to the base of large boulders and rocks along the water line. Our group had great finds for us to keep, but the mud had a BEST "find" of its own to keep....Susan O'Connor's flip flop got sucked down in the muddy bottom – never to be found again. She was down to one!

ARMADILLOS? AT THE BEACH?

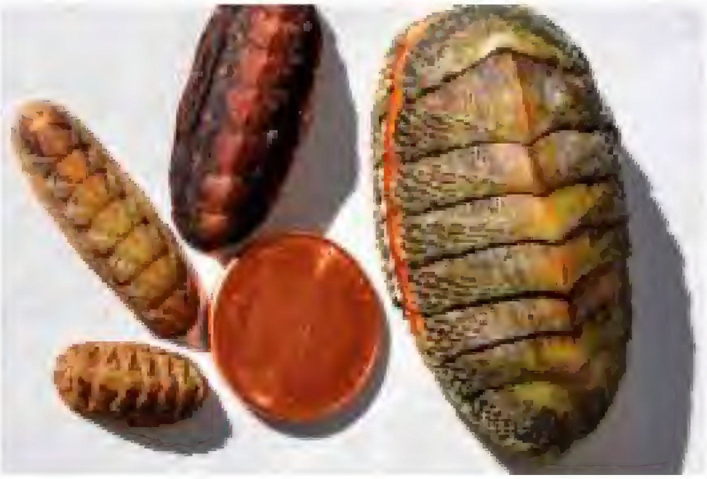
Chitons are fascinating to me because of how unusual they are with their plates and girdles. Imagine my excitement when I turned over a rock in the shallows of Palmar de Ocoa and found my first ever chiton in its natural environment! There were a lot of rocks and rubble in the area where I was snorkeling so this seemed to be the perfect place for me to find them. The common West Indian chiton (*Chiton tuberculatus)*, the largest one I'd collected measuring about 1 ½", was actually kind of scary looking. It reminded me of one of those tropical beetles that are so big! "Alright, now I've found some. Now what do I do?" I found Vicky Wall, a renowned expert at flicking off chitons and preserving them and asked her for her advice.

"You have to get under them quickly with the blade of your knife and flick them off fast or else they will latch on and you won't get another chance to get them off." She showed me with the large one and guided me on how to get them off of the surface. "Put them quickly into a container with salt water and they will eventually relax after curling up into a tight ball." I've seen that happen before and they always reminded me of armadillos curled up in defense. I took her advice and brought back four beautifully preserved specimens.

The much talked-about flock of pink flamingos were located after some searching by Everett Long. We were able to get close enough in our boats to watch them as they stood in the shallow water before they took off over our heads.

From there we boated back across the bay and southward past the Playa de Salinas beaches to an area named Derrumbao, where the local fishermen bring in their boats and fishing nets. After searching around the boats and nets, we realized there was nothing to be found so we geared up and headed into the water. It was here that Jeannette Tysor found a very nice king helmet, *Cassis tuberosa*. The current was very strong and I and a few others decided that instead of fighting it we'd beach-comb. David Bunn was called by the shade of a nearby bush with a beached boat underneath and settled down for a nap, all the while being watched by some friendly goats munching nearby.

MONDAY morning we snorkeled back at the spot where we went Friday till lunch. Afterward we all cleaned up and squeezed into our van and headed to the closest town of Bani, about an hour northeast of Las Salinas, for a little local shopping. Many of us were interested in finding jewelry made with Larimar, a rare blue form of pectolite, which is only mined in the southwest portion of the Dominican Republic. We all quickly learned from store owners, with Glenn and Randy interpreting, that the shops in Bani didn't have Larimar. Bani is not known as a tourist destination for shopping, which explained why Larimar was nowhere to be found. Putting a halt to our search we made the best of our day when Glenn and Randy mentioned the ice cream shop they knew about. Ice cream is a wonderful treat anywhere!



A small collection of chitons. They look prehistoric and indeed have a fossil record that goes back at least 400 million years. They have been called "coat-of-mail" shells.

We visited a department store that had everything under the sun, but the thing that impressed us the most were the aisles filled with shelves and shelves of deodorant. Also in town was the Cathedral Nuestra Señora de Regla, originally built November 6, 1689. This is a beautiful place to stop and enjoy the architecture of the church. Natural disasters took their toll on the building and many renovations took place over the years. Impressive stained glass windows were put in place in 1993.

I mentioned "culture shock" before. It seemed that the ratio of motorcycles to other road vehicles was almost equal. Motorcycles were just about everywhere you could imagine. There had been motorcycles on the beach at Derrumbao and also the salt flats we traveled on Saturday. I found this pizza delivery motorcycle on the street. I'm used to seeing the stick-on signs on top of cars from local pizza shops. It was just another quirky difference I enjoyed.

Motorcycles were also used as taxis. It wasn't uncommon to see them zipping by with at least four people clutching onto each other, half-way hanging off the sides and back of the motorcycle.

As we drove back to Las Salinas, we stopped at a roadside stand with handmade wooden wares, getting drinks, snacks, and fresh bananas off of stalks. Our shopper, Susan O'Connor was satisfied and happy.

TUESDAY was spent at Punta Salinas (*Punta* means tip or point,) the point of the Playa de Salinas beach area, but on the inner part towards the bay. Glenn said that the inner side of Punta Salinas (the bay side) would have a good low tide very early in the morning. "How early?" we asked. "How do you feel about getting into the water at 6:30 am?" Since we hadn't been on the inside of the bay yet, we said "OK. We're all in!" This area had wide expanses of grass and sand to explore, allowing us to go farther out than we were able to go in other areas. It was here, across the bay from Palmar de Ocoa and the Pink Flamingos, that I found a long pink feather beached on the sand.

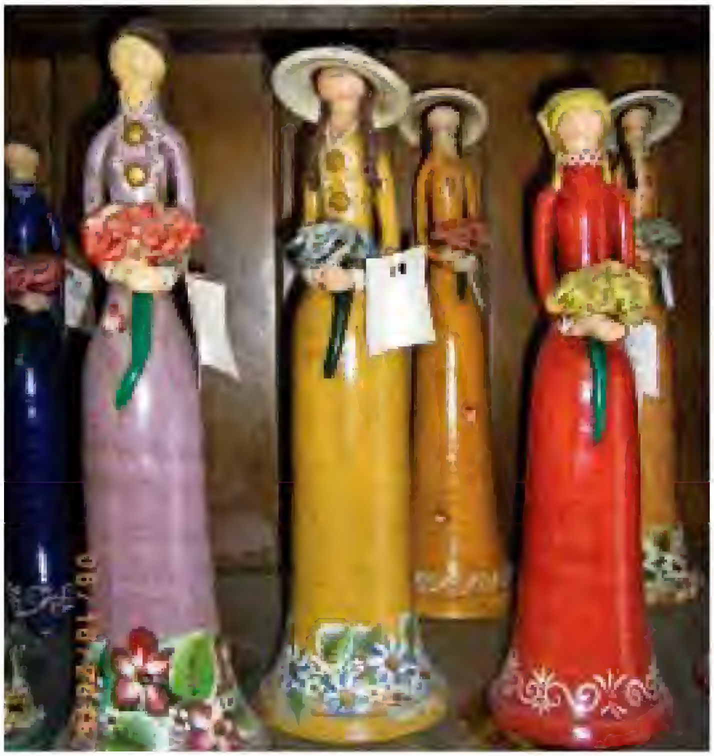
SUCH A ROOKIE!

I'd snorkel for a while then stop and come up to see where others were. Sometimes flippers would pop out of the water as people dove or I'd see a snorkel floating along. Occasionally someone would stand up way out from shore and examine something they found and it was then I realized just how far out I could have gone. That's where the turtle grass beds were and it turns out, those beds proved to be treasure troves as Jeanette Tysor came out with a queen helmet *Cassis madagascariensis* and a dog-head Triton *Ranularia cynocephala*. I watched others come out with helmet shells, murexes, rooster conchs, and milk conchs. Glenn found several carrot cones, *Conus daucus*, along with a juvenile Atlantic Triton, *Charonia variegata*, all of which were live. He took a carrot cone and the juvenile Triton back to his container filled with salt water allowing them to relax and come out of their shells. Susan Rotman photographed both in action.

David Bunn had lost one of his flippers earlier but that didn't slow him down. From the turtle grass he brought out a mature Atlantic Triton, *Charonia variegata*, that had been in the process of eating a starfish. A group of us watched the spectacle and after realizing that it wasn't in the water anymore, the Triton promptly spat, bubbled, and squirted the rest of the starfish out. We all jumped back in surprise as the Triton gave us no advance notice. It was a very noisy and splashy process!

This area was full of bivalves. I found zig zag scallops, Pennsylvania lucines, turkey wing arks, king Venuses, and calico clams from the sandy bottom, and I was very satisfied but once I saw people with helmet shells, conchs, murexes, etc., I realized just how much I had missed. Many thoughts ran through my head, such as, "David had only one flipper and look at what he found!" "Why was I not seeing these shells myself?" "Just how many did I overlook?" "I knew I didn't go out far enough." I quickly realized that I needed to gain more confidence snorkeling to feel more comfortable being a little farther from shore. And I definitely did NOT have the practiced eye needed to see these mollusks in their natural habitat. I'm such a snorkeling rookie. My "fever" just rose – I needed to do more of these trips now, so I could get that eye.

WEDNESDAY came, the day before our departure. Half of our group went one more time to snorkel that morning after Glenn offered, while the other half stayed behind and began packing. Even though we all cleaned our shells immediately after arriving back at our hotel each day, I was still a little nervous about getting behind. I opted to stay back and finish cleaning and packing my shells with the expert help of my roommate, Hazel Andress. After having lunch with everyone at the dining area, I finally got the chance to enjoy the salt water pool at the hotel with Hannah Rotman for the rest of the afternoon till dinner. The pool was just below the balcony of the dining area and all week long had always looked so inviting. It was a very nice way to finish the week.



The "faceless" dolls, carved to represent any of the many ethnicities of the Dominican Republic.

Our hosts, Jorge and Bernice Domenech provided a special dinner buffet for our group as part of our last night's celebration. They outdid themselves with a delicious spread of fresh lobster and seafood, potatoes, and fresh local fruits and vegetables with champagne.

Once dinner was finished, the last minute details began, including finally buying something we walked past every day in our hotel. The "faceless dolls." These beautiful dolls filled the cabinet in the lobby. They were painted with bright colors and details but curiously, there were no facial features. A tag tied to the bottom of them told of their history and why they were called "faceless".

The artists do this intentionally, not showing one specific facial feature due to the fact that people of the Dominican culture are of Spanish, African, French, and Arawak descent. Arawak is an Indian culture that originated in South America. The dolls are usually made of wood or clay. Many of our group purchased some as gifts. We saw more of these dolls in the airport in Santo Domingo.

THURSDAY morning, June 18, we departed Las Salinas at 7:45 am for the two hour ride back to the airport on a shuttle van similar to the one in which we arrived. We arrived at the airport in Santo Domingo at 10:00 am, thanked

The Dominican Republic shellers.

Back row L-R: Vicky Wall, Karlynn Morgan, Dora Zimmerman, Bill Bennight, Ed Shuller, Dana Bunn, Hannah Rotman, Jeanette Tysor.

Front row L-R: Susan Rotman, Susan O'Connor, Gayle Hughes, Charlotte Thorpe, Hazel Andress, Everett Long, David Bunn. (Glenn Duffy behind the camera).

Glenn and Randy for their wonderful trip and all of their hard work, then made our way through check-in, waiting for our flight to Fort Lauderdale, Florida at 2:50 pm.

It was here, at the airport, that we finally found Larimar jewelry!

ONE LAST SHOCK!

I had never experienced Customs before, but I had received advice from many about the process. Now back in Ft. Lauderdale airport, I was still in awe of all the dogs and large guards covered in vests and uniforms. So many people filled the area and lines. It was a very imposing sight and I couldn't help but be nervous. Thankfully, all went well. No sirens, bells or whistles went off and no guards or dogs came to pull me out of line.

After we checked into our hotel, one of the first things most of us did was head out for a good old American meal with a follow-up ice cream from McDonald's! It's funny the things we miss. Everyone had different departure schedules for the next day, so our group said our "goodbyes" the night before we left.

Friday the hand-wringing began as I made my way through the Ft. Lauderdale airport to BWI airport in Maryland. Success! Wheels up to Maryland at 10:41 am. My husband was waiting for me with a bouquet of flowers as a congratulations on the success of my travel.

I had so many people looking after me and helping me all along the way. Their guidance and support made my first experience delightful. Since that trip, I have developed a "fever" for more shelling excursions. With the help of some very experienced club members who took me under their wing, I had the best first time shelling trip! I can't wait for the next one!

SPECIES LIST

June 11-18, 2016 North Carolina Shell Club
Las Salinas, Dominican Republic

Dora Zimmerman, Everett Long, Ed Shuller, Jeanette Tysor, Vicky Wall, Karlynn Morgan, Hazel Andress, Glenn Duffy

GASTROPODS

Eoacmaeidae	
Eoacmaea pustulata (Helbling, 1779)	spotted limpet
Fissurellidae	
Fissurella barbadensis (Gmelin, 1791)	Barbados keyhole limpet
Fissurella rosea (Gmelin, 1791)	rosy keyhole limpet
Diodora listeri (d'Orbigny, 1847)	Lister's keyhole limpet
Tegulidae	
Tegula fasciata (Born, 1778)	smooth Tegula
Cittarium pica (Linnaeus, 1758)	West Indian top shell
Turbinidae	
Lithopoma caelatum (Gmelin, 1791)	carved star shell
Lithopoma phoebium (Röding, 1798)	long-spined star shell
Lithopoma tuber (Linnaeus, 1758)	green star shell
Turbo castanea Gmelin, 1791	chestnut turban
Neritidae	
Nerita peloronta Linnaeus, 1758	bleeding tooth nerite
Nerita tessellata Gmelin, 1791	checkered nerite
Nerita versicolor Gmelin, 1791	four-tooth nerite
Smaragdia viridis (Linnaeus, 1758)	emerald nerite
Vitta virginea (Linnaeus, 1758)	virgin nerite
Batillariidae	
Lampanella minima (Gmelin, 1791)	West Indian false cerith
Cerithiidae	
Cerithium lutosum Menke, 1828	dwarf cerith
Cerithium litteratum (Born, 1778)	stocky cerith
Modulidae	
Modulus modulus (Linnaeus, 1758)	button snail
Potamididae	
Cerithideopsis scalariformis (Say, 1825)	ladder horn shell
Turritellidae	
Turritella exoleta (Linnaeus, 1758)	eastern turret-shell
Littorinidae	
Echinolittorina ziczac (Gmelin, 1791)	zebra periwinkle
Cenchritis muricatus (Linneaus, 1758)	beaded periwinkle
Littoraria angulifera (Lamarck, 1822)	mangrove periwinkle
Strombidae	
Lobatus costatus (Gmelin, 1791)	milk conch
Lobatus raninus (Gmelin, 1791)	hawk-wing conch
Strombus pugilis Linnaeus, 1758	West Indian fighting conch
Xenophoridae	
Xenophora conchyliophora (Born, 1780)	Atlantic carrier-shell
Calyptraeidae	
Crucibulum auricula (Gmelin, 1791)	West Indian cup and saucer
Hipponicidae	
Cheilea equestris (Linnaeus, 1758)	false cup and saucer
Cypraeidae	
Luria cinerea (Gmelin, 1791)	Atlantic gray cowrie
Erosaria acicularis (Gmelin, 1791)	Atlantic yellow cowrie
Ovulidae	
Cyphoma gibbosum (Linnaeus, 1758)	flamingo tongue
Cymbovula acicularis (Lamarck, 1811)	West Indian simnia
Triviidae	
Pusula pediculus (Linnaeus, 1758)	coffee bean trivia
Naticidae	
Naticarius canrena (Linnaeus, 1758)	colorful Atlantic Natica
Polinices lacteus (Guilding, 1834)	milk moon-shell
Cassidae	
Cassis flammea (Linnaeus, 1758)	flame helmet
Cassis madagascariensis Lamarck, 1822	queen helmet
Cassis tuberosa (Linnaeus, 1758)	king helmet
Cypraecassis testiculus (Linnaeus, 1758)	reticulated cowrie-helmet

Bursidae	
Bursa granularis (Röding, 1798)	granular frog-shell
Ranellidae	
Cymatium femorale (Linnaeus, 1758)	angular Triton
Gutturnium muricinum (Röding, 1798)	knobbed Triton
Monoplex nicobaricus (Röding, 1798)	gold-mouthed Triton
Monoplex pilearis (Linnaeus, 1758)	Atlantic hairy Triton
Ranularia cynocephala (Lamarck, 1816)	dog-head Triton
Charonia variegata (Lamarck, 1816)	Atlantic Triton
Tonnidae	
Tonna pennata (Mörch, 1853)	Atlantic partridge tun
Epitoniidae	
Epitonium multistriatum (Say, 1826)	many-ribbed wentletrap
Gyroscala lamellosa (Lamarck, 1822)	lamellose wentletrap
Muricidae	
Chicoreus spectrum (Reeve 1846)	pink murex
Coralliophila erosa (Röding, 1798)	short coral-shell
Dermomurex pauperculus (C. B. Adams, 1850)	little aspella
Morula nodulosa (C. B. Adams, 1845)	blackberry drupe
Phyllonotus pomum (Gmelin, 1791)	apple murex
Vasula deltoidea (Lamarck, 1822)	deltoid rock-shell
Buccinidae	
Gemophos tinctus (Conrad, 1846)	tinted cantharus
Pisania pusio (Linnaeus, 1758)	miniature trumpet Triton
Nassariidae	
Phrontis alba (Say, 1826)	variable dog whelk
Columbellidae	
Rhombinella laevigata (Linnaeus, 1758)	smooth dove-shell
Columbella mercatoria (Linnaeus, 1758)	common dove-shell
Nitidella nitida (Lamarck, 1822)	glossy dove-shell
Marginellidae	
Volvarina avena (Kiener, 1834)	orange-banded marginella
Cystiscidae	
Persicula pulcherrima (Gaskoin, 1849)	decorated marginella
Mitridae	
Mitra barbadensis (Gmelin, 1791)	Barbados miter
Mitra nodulosa (Gmelin, 1791)	beaded miter
Olividae	
Americoliva reticularis (Lamarck, 1811)	netted olive
Oliva jamaicensis Marrat, 1867	
Olivellidae	
Olivella nivea (Gmelin, 1791)	West Indian dwarf olive
Turbinellidae	
Vasum muricatum (Born, 1778)	Caribbean vase
Harpidae	
Morum oniscus (Linnaeus, 1767)	Atlantic morum
Conidae	
Conus daucus Hwass in Bruguière, 1792	carrot cone
Conus anabathrum Crosse, 1865	Florida cone
Conus mus Hwass in Bruguière, 1792	mouse cone
Drilliidae	
Drillia albomaculata (C. B. Adams, 1845)	white-banded drillia
Architectonicidae	
Architectonica nobilis Röding, 1798	common sundial
Bullidae	
Bulla striata Bruguière, 1792	common Atlantic bubble
Ellobiidae	
Melampus monile (Bruguière, 1789)	Caribbean melampus

BIVALVIA

Mytilidae	
Modiolus americanus (Leach, 1815)	tulip mussel
Arcidae	
Anadara notabilis (Röding, 1798)	eared ark
Arca zebra (Swainson, 1833)	turkey wing
Barbatia candida (Helbling, 1779)	white-bearded ark
Barbatia domingensis (Lamarck, 1819)	red-brown ark
Noetiidae	
Arcopsis adamsi (Dall, 1886)	cancellate ark
Glycymerididae	
Glycymeris decussata (Linnaeus, 1758)	decussate bittersweet
Tucetona pectinata (Gmelin, 1791)	comb bittersweet
Pteriidae	
Isognomon radiatus (Anton, 1838)	Lister's tree oyster
Pinctada imbricata (Röding, 1798)	Atlantic pearl oyster
Pinnidae	
Atrina rigida (Lightfoot, 1786)	American stiff pen shell
Pinna carnea Gmelin, 1791	amber pen shell
Limidae	
Ctenoides scaber (Born, 1778)	rough Lima
Lima lima (Linnaeus, 1758)	Caribbean spiny Lima
Ostreidae	
Dendostrea frons (Linnaeus, 1758)	frond oyster
Plicatulidae	
Plicatula gibbosa Lamarck, 1801	kitten's paw
Pectinidae	
Caribachlamys ornata (Lamarck, 1819)	ornate scallop
Caribachlamys sentis (Reeve, 1853)	sentis scallop
Euvola ziczac (Linnaeus, 1758)	zig zag scallop
Lucinidae	
Anodontia alba Link, 1807	buttercup lucine
Clathrolucina costata (d'Orbigny, 1846)	costate lucine
Codakia orbicularis (Linnaeus, 1758)	tiger lucine
Lucina pensylvanica (Linnaeus, 1758)	Pennsylvania lucine
Phacoides pectinatus (Gmelin, 1791)	thick lucine
Chamidae	
Chama macerophylla Gmelin, 1791	leafy jewel box
Chama sarda Reeve, 1847	cherry jewel box
Pseudochama cristella (Lamarck, 1819)	left-handed jewel box
Cardiidae	
Acrosterigma magnum (Linnaeus, 1758)	magnum cockle
Americardia media (Linnaeus, 1758)	Atlantic strawberry cockle
Dallocardia muricata (Linnaeus, 1758)	yellow cockle
Fulvia laevigata (Linnaeus, 1758)	common egg cockle
Papyridea lata (Born, 1778)	spiny papercockle
Papyridea soleniformis (Bruguière, 1789)	spiny papercockle
Mactridae	
Mactrotoma fragilis (Gmelin, 1791)	fragile surfclam
Tellinidae	
Arcopagia fausta (Pulteney, 1799)	faust tellin
Laciolina laevigata (Linnaeus, 1758)	smooth tellin
Laciolina magna (Spengler, 1798)	great tellin
Tellinella listeri (Röding, 1798)	speckled tellin
Psammobiidae	
Asaphis deflorata (Linnaeus, 1758)	gaudy asaphis
Heterodonax bimaculatus (Linnaeus, 1758)	small false donax
Veneridae	
Lirophora paphia (Linnaeus, 1767)	king Venus
Chioneryx pygmaea (Lamarck, 1818)	white pygmy Venus
Megapitaria maculata (Linnaeus, 1758)	calico clam
*Periglypta lister*i (Gray, 1838)	princess Venus
Dentaliidae	
Coccodentalium carduus (Dall, 1889)	yellow tusk shell
Acanthochitonidae	
Acanthochitona hemphilli (Pilsbry, 1893)	Hemphill's chiton
Chitonidae	
Chaetopleura apiculata (Say in Conrad, 1834)	eastern beaded chiton
Chiton tuberculatus Linnaeus, 1758	common West Indian chiton
Ischnochitonidae	
Stenoplax floridana (Pilsbry, 1892)	Florida slender chiton

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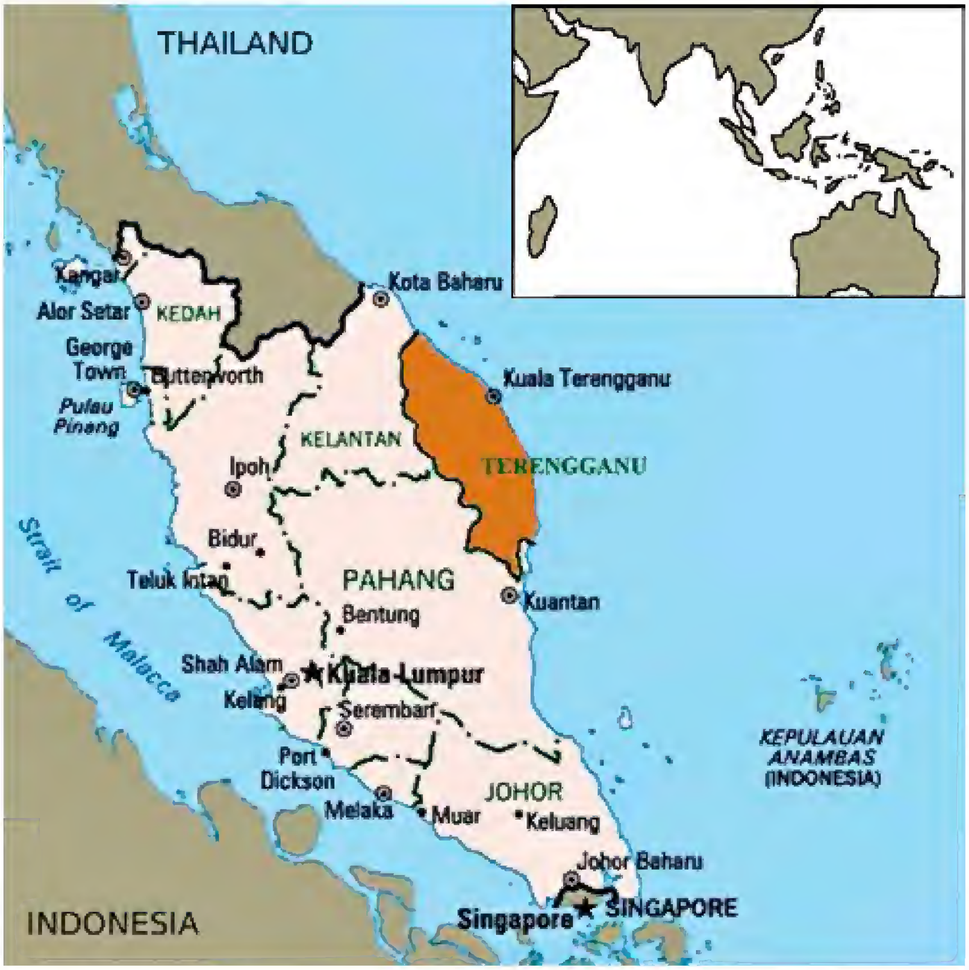
Working out the mussels of Peninsular Malaysia

Pei-Yin Ng, John-James Wilson & Alexandra Zieritz



Peninsular Malaysia

Mussels are known as "kupang" in the Malay language and marine mussels are prized by locals in Peninsular Malaysia as something good to eat. Freshwater mussels (order Unionida) are much less well-known by locals and are particularly poorly-known by scientists. Until recently, the most current scientific report of mussels in Peninsular Malaysia dated back almost 50 years. There has been fresh interest in freshwater mussels among scientists in Peninsular Malaysia with the establishment of a commercial freshwater pearl culture at Kenyir Lake, in the northeastern state of Terengganu. Worryingly, the commercial venture has focused on an invasive species – the Chinese pond mussel (*Sinanodonta woodiana*) – overlooking native species.

The native mussels of Peninsular Malaysia, however, are finally getting the attention they deserve. An international team of researchers led by the University of Nottingham Malaysia Campus have surveyed over 150 sites across the peninsula to record any mussels present. A report of part of this work can be found in *Ellipsaria* (Bogan et al. 2015). Due to the lack of reports and spotty taxonomic treatment of the freshwater mussels of Peninsular Malaysia, our team is using DNA barcoding to help identify and record species. DNA barcoding is a method of species identification and discovery using a short section of DNA (a DNA barcode) from a standardized region of the genome. For animals, the DNA barcode region is a fragment of the *cytochrome c oxidase I* gene from the mitochondrial genome. The project was supported by a COA grant and completed as part of a final-year undergraduate project at the Museum of Zoology, University of Malaya, Kuala Lumpur. Preliminary findings were presented at the 6th International Barcode of Life conference in Guelph, Ontario, Canada (Ng et al. 2015).

Our team revealed the presence of six genera of mussels in Peninsular Malaysia, which, after DNA barcoding of a total of 67 populations, were assigned to 12 BINs (Barcode Index Numbers). The Barcode Index Number System is an online framework that automatically clusters DNA barcode sequences into putative species showing close concordance with species limits recognized by traditional taxonomists. DNA barcoding successfully rectified several misidentifications of mussels based solely on the shell characters. Besides DNA barcoding, we have also sequenced a gene from the nuclear genome and conducted a simple phylogenetic analysis of the freshwater mussel species. The analysis flagged several issues with the current taxonomy at the subfamily and genus levels, providing a starting point for further efforts to resolve the position of the freshwater mussels of Peninsular Malaysia on the "unionid tree of life." A comprehensive study of the distribution of freshwater mussels in Peninsular Malaysia is in preparation by our group, so stay tuned.

Acknowledgments:

We thank Manuel Lopes-Lima (University of Porto), Arthur Bogan (North Carolina Museum of Natural Sciences), and Ronaldo Sousa (University of Minho) for their participation in part of the field surveys. University of Nottingham Malaysia Campus students F.N.B. Mahadzir, H.W.

Sampling unionid mussels in a small stream in Negeri Sembilan.

Sampling tissue snips for DNA barcoding.

Lun, H.M. Lye, M.M. Chu, M.M Norizam, M.S.A.b. Embong, N.b. Mahmood, T.J. Min, W.Q. Loke and V.L.P. Wen provided invaluable help as interpreters and field assistants.

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Phil Poland

There were two giants here in the Florida sheller's world. I met the first, Harry Lee, in the early 1990s, and Harry quickly connected me with Phil Poland. Phil was an avid and skilled field worker. We soon roamed Florida together, collecting and observing. Phil was indefatigable, both in his enthusiasm for field work and especially in utilizing and sharing the products of his labors to assist and further the efforts of researchers around the world. Over 30 years of dedicated effort in Florida, Phil amassed multiple collections of well-preserved and documented marine shells, all of which, without hesitation, were provided to all researchers, world-wide, simply for the asking. He repeatedly donated collections and documentation to museums. His final collection of marine micros accumulated during the '90s was donated to Let's Talk Seashells and has served as the backbone for many of the presentations on LTS. Phil's generosity and enthusiasm for using his love of shells for the benefit of research, conservation, and enhanced knowledge was admirable and inspired me to emulate his philosophy. Phil was a complex personality, as generous as they come, modest to a fault, a brilliant observer, with strong political and philosophical opinions (oh, the conversations we had), and a wonderful sense of humor. In the past decade Phil's efforts turned to *Liguus*, while mine remained with marine micros. He donated his entire Florida marine collection to the Smithsonian in 1999. We lived on opposite sides of Florida. He still went into the field for me when I was in need of samples of west coast species, but we did not manage to get together as in the "old days." We always planned to get together "next year" during the south Florida collecting season, but it didn't happen. I'll miss you, Mensch.

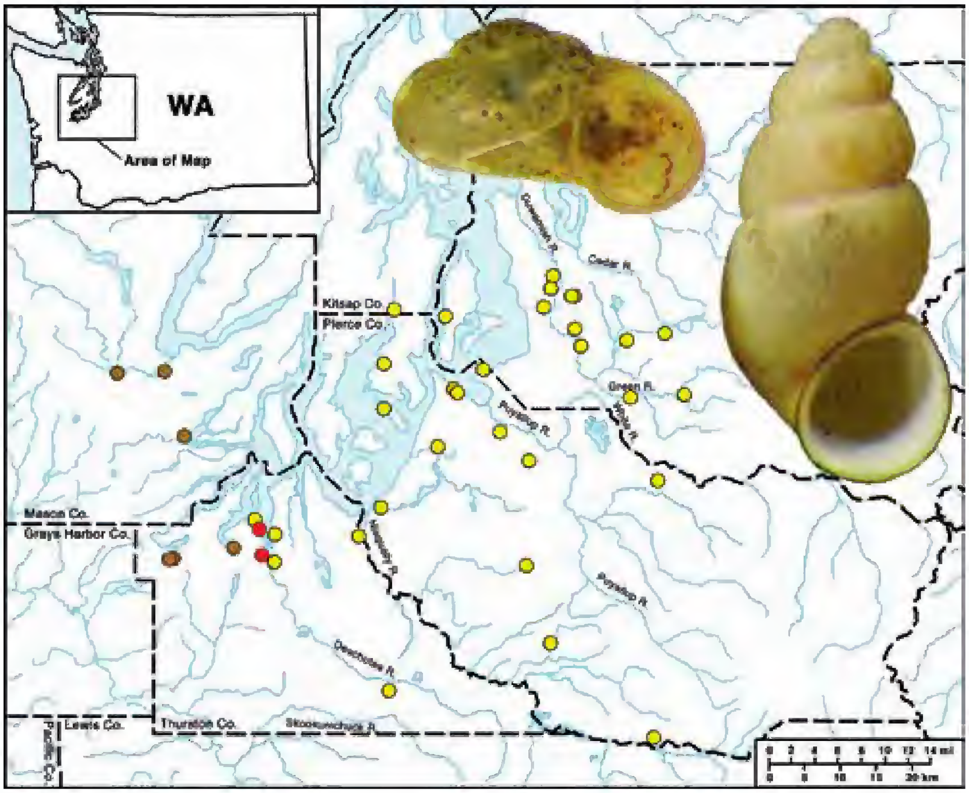
Marlo F. Krisburg

Liguus fasciatus graphicus from Pilsbry (1912)

Springs and the minute snails that inhabit them in the Puget Sound region: Searching for the concealed

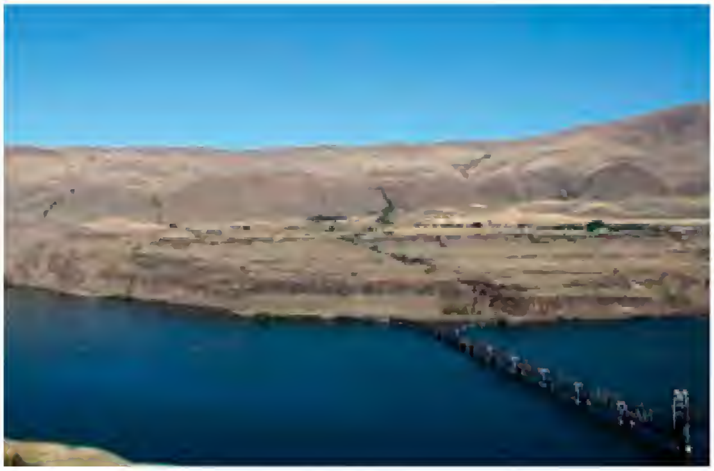
Edward J. Johannes

As part of a phylogenetic study with Dr. David Campbell, Gardner-Webb University, North Carolina, on *Juga* and *Pristinicola*, I have been surveying springs for the latter snail in the Puget Sound basin. Permanent springs (by springs I also include seeps) are ones running year round for thousands if not a million years or so, and may occur singly or in groups and are not only an important habitat for freshwater mollusks, in particular snails, but for many other animals and plants, especially in arid areas. Springs have a disproportionate occurrence of rare or endemic species, some found at one or a few springs and as a result are of major conservation concern (Sada *et al.* 2001, Hershler et al. 2014). Springs also serve as a thermal refugia for many species including springsnails, especially those that were unable to migrate rapidly enough as the climate warmed during the end of the last ice age (Late Pleistocene). I have found cold springs in the Puget Sound basin ranging from 11 to 13 ºC, approximately the current mean annual ambient air temperature in the region, indicating they are coming from a relatively shallow groundwater sources. Hopefully human caused climate change will not increase water temperatures of these springs above the tolerance threshold of springsnails or other taxa. In the opposite temperature spectrum, hot springs (actually warm springs, above 46 ºC is too hot) support freshwater snails and other animals that cannot exist at cooler temperatures, and have deep-seated groundwater sources (Sada *et al.* 2001, Clarke 2014). I have found no thermophile snail species occurring in the Puget Sound region; only two cold-water taxa, *Pristinicola hemphilli* (Pilsbry, 1890) (pristine pyrg) and *Colligyrus* n. sp. (coastal duskysnail) have been found during my surveys of springs here and elsewhere (Johannes 2015). Recent DNA analysis suggest placement of the coastal duskysnail under a new genus (Liu *et al.* 2015). Both snails occur mostly in seeps to small-medium sized springs, though on rare instances *Pristinicola* is found in small spring influenced creeks and bigger springs. To me, how these snails migrate from one spring, whether hot or cold, to another is a very interesting biogeographic problem, especially in the recently deglaciated Puget Sound basin.

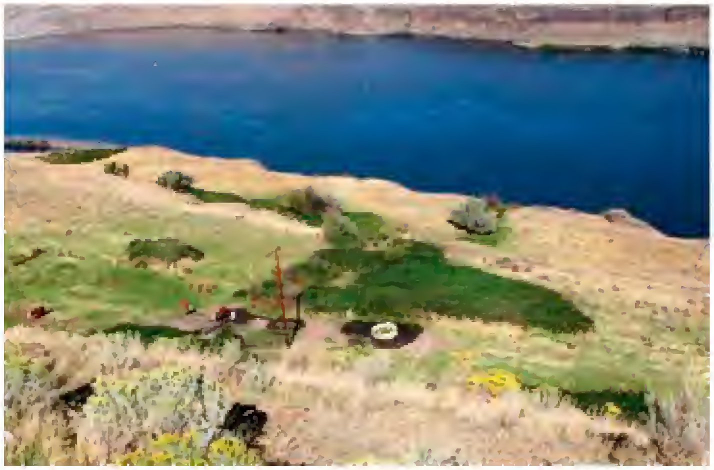


Map showing distribution of *Pristinicola hemphilli* (yellow dots) and *Colligyrus* n. sp. (brown dots) in the Puget Sound basin. Red dots are sites where they co-occur. Insets of *Colligyrus* n. sp. (coastal duskysnail; no other western U.S. hydrobioid has a near planispiral shell like this minute species; height 1.2 mm) on the left and *Pristinicola hemphilli* (pristine pyrg; height 2.8 mm) on the right. Both snails at same scale. Photos by the author.

If you are inspired by finding new molluscan species, as I am, springsnails are by far the easiest way to go in the western United States. Many have been scientifically described (mostly in the genus *Pyrgulopsis*) from this region within the last decades, with an unknown number yet to be found or named, including the aforementioned coastal duskysnail. Of the freshwater mollusks that occur in the western U.S., the few listed under the Endangered Spe-



Springs (green strips) on the Washington side of the Columbia River Gorge west of Wishram. Bridge is the Celilo Bridge also known as the Oregon Trunk Rail Bridge. *Juga* n. spp. and *Pristincola* occur in springs in this region of the Columbia Gorge.



Spring on the Oregon side of the Columbia River Gorge west of Celilo Village. All-too-common livestock are allowed access to spring sources degrading them. Left photo and photo above taken at the same vantage point along side Wasco County Road 143 by the author.

cies Act (ESA) include a significant number that are either spring dwellers or found in habitats influenced by springs or groundwater. Neither springsnail that occurs in the Puget Sound region is listed under the ESA. Despite the relative small size of the habitat, I have found searching for springs in the open arid lands of the western U.S. relatively easy. From a distance the green strip of vegetation surrounding the source and run of springs can be readily seen on hillsides or valleys. Even U.S. Geological Survey (USGS) 7.5-minute topographic maps, also known as 7.5' quadrangles, often have springs indicated in such areas. These are easily seen in areal photos, the basis for these maps, or when using Google Earth satellite images. In areas with dense forest and vegetative cover, however, such as in the Puget Sound region, searching for spring habitats is extremely difficult. Often the USGS 7.5' quadrangles in this region do not show them. Even large ones with names, like Crystal Springs (N.-most site for *Pristinicola* in the Puget Sound region) occurring a half mile from my house, are missed. You can also forget about Google Earth helping as well. So what is one to do?

From experience I know that most springs emanate from the side or base of hillsides, or along drainages often in small stream ravines or gulches. These are good geographic features to narrow searches. Permanent springs in the Puget Sound basin depend on a big enough upland (catchment) area for rainfall, that are underlain mostly by permeable geologic units largely glacially deposited allowing infiltration to a sufficient depth before hitting impermeable layers to store enough underground water volume for year round flow even during the dry summer months. Searching (crashing through) all these well-vegetated slopes and ravines for springs would be slow going. If they exist, looking at geologic maps may help whittle down the search area, but is dependent on prior knowledge of which units produce springs. Even then it does not tell you where the springs will occur in these units that could cover many square miles. Once again we are back to vegetation, obscuring the geology of this region further hindering searches. There seems to be a consistent theme here, vegetation. Instead of considering it a barrier, why not use it. That is exactly what I do. Instead of looking for springs, I look for specific kinds of vegetation on slopes and in ravines, ones that are wetland indicators (for a practical local guide see Cooke 1997, others likely available for your region). This is especially useful while tooling along roads both in the actual sense or virtually when using Google Earth street view (where available), as plants are easier to see than the springs they obscure. Another method I use is to watch for water in ditches during the dry summer months as a possible indicator of springs; but ditches are not always present along roads and during the rainy season are not as helpful indicator as is the presence of wetland plants.

I am not the first to use plants as indicators. Having a background in geology, I was aware that in addition to searching for a show of 'color', miners have known since medieval times that particular plants could be used as indicators to the presence of ore bearing deposits. Both *Lychnis alpina*, a small pink-flowering plant in Scandinavia, and *Haumaniastrum katangense*, a white-flowered shrub in central Africa, were known associates of copper mother lodes. Recently, a tree, possibly *Pandanus candelabrum*, in Liberia, was noticed to occur only in kimberlite soils, becoming the first indicator species for diamond-bearing kimberlite pipes (Haggerty 2015). Before this, diamonds in Liberia were mined only from placer deposits and their sources could not be found, hidden not only by the thick tropical vegetation, but

Well concealed spring run near county boundary sign with *Colligyrus* along Cloquallum Road, Chehalis River drainage, Grays Harbor County. Yellow flowers (pointer) of skunk cabbage revealed presence of spring. Photo by Terry Frest.

Concealed spring with *Pristinicola* along Chatwood Road SE, Deschutes River drainage, Thurston County. Note the presence of devils club, horsetails and water parsley. Drew Skinner for scale. Photo by the author.

also ironically by dense impenetrable thickets of *Pandanus* trees. Here in the western U.S., the nickel-chromium bearing serpentinite rocks in the Klamath and Siskiyou mountains of Oregon and California have endemic plants, such as the carnivorous *Darlingtonia californica* (California pitcher plant), that grow nowhere else. Terrence Frest (deceased, my former Deixis Consultants partner), while surveying the Midwest Driftless area during the 1980s for the ESA, listed endangered *Discus mcclintockii* (F. C. Baker, 1928) (Iowa Pleistocene snail), used both geology to define the extent of his search area and vegetation to zero in on a rather locally narrow habitat where this and several other glacial relict land snails occurred (Frest, 1984, 1991). He coined the name algific talus slopes for this unique habitat (Frest, 1981). He noticed that algific talus slopes consistently occurred in two separate Paleozoic limestone formations, both with thin shaley layers that allowed periglacial frost and ice wedging of limestone blocks on N.-facing slopes during the close of the Wisconsinan (Late Pleistocene). This created a mechanical karst where ice could accumulate during the winter months resulting in year round refrigerated talus slopes, the talus debris falling from the cliff faces. This created a rather stable microclimate that not only protected the glacial relict land snails from climate change at the end of the last ice age, but also allowed both relict and disjunct plants and trees to exist in the Midwest that would otherwise be extinct or found further north in Canada. Using geologic maps, he determined what hillsides the Paleozoic formations cropped out on and could quickly find these small habitats by searching for occurrences of specific trees such as Canada yew, balsam fir, birch, basswood and sugar maple or plants, especially the ESA listed threatened *Aconitum noveboracense*, northern wild monkshood. Using his method, he and later others were able to discover over three hundred sites within a relatively short time. This when previously only a couple of sites had been found after extensive searches over many years. Most sites are now included in The Driftless Area National Wildlife Refuge, the first federal refuge created to protect a mollusk, the Iowa Pleistocene snail, and a plant, the northern wild monkshood.

Unlike the examples given above, most of the plants occurring in the Puget Sound region that are wetland indicators are not necessarily restricted to spring habitats. Occurrence of these plants on slopes, slope bases, or ravines improves the chances they actually indicate the presence of springs. There are only three plants I often find closely associated with springs – two of them painfully make me wonder why nasty plants are found at springs. These would be *Rorippa nasturtium-aquaticum* (watercress), a widely introduced European plant that prefers cool permanent water such as spring runs or ditches fed by springs; *Oplopanax horridus* (devil's club), with fine irritating spines on stems and leaves; and finally *Urtica dioica* (stinging nettle), with hollow stinging hairs on leaves and stems that can inject a irritating histamine into your skin. I have observed *Allogona townsendiana* (I. Lea, 1838) (Oregon forestsnail) often co-occurring with the last plant at springs, including the previously mentioned Crystal Springs. It has been suggested that this landsnail has a strong affinity for *Urtica*, but I think springs have been overlooked as an important factor also (Waldock, 2002). I believe *A. townsendiana* is a glacial relict (possibly the much rarer *Cryptomastix devia* (Gould, 1846) (Puget Oregonian) is as well), preferring a stable cool microhabitat offered by springs, somewhat like the algific talus slope landsnails inhabit in the Midwest. Other wetland plants I often look for include *Lysichiton americanum* (skunk

***Allogona townsendiana* found associated with a spring and *Urtica* on E. side of Waldrick Road SE near Silver Spring, Deschutes River drainage, Thurston County. Snails about 27 mm wide. Photo by Bert Bartleson.**

cabbage), which has smelly yellow flowers; *Oenanthe sarmentosa* (water parsley), reported to be poisonous, can be found in spring runs or spring influenced small creeks; *Typha* spp. (cattails) often found in ditches with permanent water; *Cicuta douglasii* (western water-hemlock) is poisonous, do not eat; and *Mimulus guttatus* (common monkeyflower). Ones I don't trust as much to indicate springs include *Carex* spp. (sedges) and *Equisetum* spp. (horsetails), but they do indicate slopes that are wetter than typical and suggest the possibility of springs in the area. They also occur at springs. As you can see the list of wetland indicator plants I use is not very extensive and learning to recognize them in the field is not difficult. So, if surveying for springsnails in the Puget Sound basin or other heavily vegetated or forest covered areas, don't look for the spring, look for the wetland indicator plants.

Acknowledgements: I would like to acknowledge James Johannes and Bert Bartleson for comments. Both Bert and Drew Skinner accompanied me in the field and it was much appreciated. I would also like to recognize the financial support for the phylogenetic study on *Juga* and *Pristinicola* in the Puget Sound basin from the Conchologists of America, City of Tukwila, Vashon Nature Center, LLC, and the Pacific Northwest Shell Club.

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June 18-19 Gulf Coast Shell Show in Panama City Beach, Florida

Jeannette Tysor and Ed Shuller with their COA Award, Shell of the Show Award, and blue ribbon. Their 25 foot display was a tribute to North Carolina collector Hugh Porter and was titled, "Mr. Seashell & North Carolina's Marine Mollusks."

The Gulf Coast Shell Show on 18-19 June 2016, was a huge success. Paid attendance was about 300 and over 50 were let in for free. The scientific exhibits totaled 365 feet of display. Shell Show Chairman was Jim Brunner and the Scientific Judges were Linda and Kevan Sunderland. Jeannette Tysor and Ed Shuller won the COA Award for their display in tribute to the well known North Carolina shell collector, Hugh Porter. The display was titled, "Mr. Seashell & North Carolina's Marine Mollusks." Their extensive display involved 10 cases and covered 25 feet. Also at this year's show was the award of the new Vokes Trophy to Vicky Wall (see p. 18). Founder

Other winners in the scientific division included: the DuPont Trophy to Linda & Jim Brunner for "Oh What Tangled Webs We Weave," the Helen Norton Award to Gene Everson for "World-wide Self-collected," Founder's Award to Carolyn and Ed Petrikin for "Colors of Worldwide Molluscs," the Student Award to Olivia Carney for "Shelling and Crafting With My Grandmother," and the Frozen Dip-net to Al Johnson for "Northwest Florida Shell, Self-collected." Shell of the Show Self-collected was the eponymous *Phyllonotus eversoni* (D'Attilio, Myers & Shasky, 1987) displayed by Gene Everson; Shell of the Show Collected by any Manner was *Echinophoria coronadoi* (Crosse, 1867) displayed by Jeannette Tysor and Ed Shuller.

Bruce William Crystal

Bruce Crystal was born on Oct. 26, 1929, in Brooklyn, N.Y., to the late Helen Haber Crystal and Reuben Robert Crystal. He grew up in Brooklyn, attending Erasmus High School, and after graduation, signed up with the U.S. Air Force Reserves. The Air Force called him to active service during the Korean War, where he worked as an ambulance driver for a hospital unit in Japan. Upon his return to the United States, he used the G.I. Bill to attend the University of California, Berkeley, receiving a bachelor of science degree followed by a doctor of optometry degree.

In 1956, he and his wife moved to Longmont, Colorado. Dr. Crystal was an avid naturalist and lifelong outdoorsman. He began with collecting butterflies as a child in the Brooklyn Botanical Garden, and as an adult, enjoyed fishing and hunting, particularly, at Swede Lake, Colorado, and along many Colorado rivers. He retired from optometry at age 48 and, with his wife, launched a 41-foot Morgan sailboat, the *Aspen Leaf*, in 1970. Moored in the British Virgin Islands, the boat afforded the couple many happy years of travel. Dr. Crystal became an avid seashell collector, corresponding with fellow shell collectors from around the world and building a prized seashell collection. One of his proudest accomplishments was completing a month-long sail with a friend from San Diego, Calif., to Tahiti, in 1979.

In retirement, Dr. Crystal and his wife traveled extensively, participating in numerous Elderhostel trips, including several bike hikes in Europe. Dr. Crystal also enjoyed woodworking and built many fine pieces for his children and grandchildren.

COA *Neptunea* Award

Many of us are beginning plans for the 2017 COA Convention in Key West, FL. One of the many events on the agenda is the annual COA *Neptunea* Award(s), and it is once again my privilege to call for nominations.

The consensus of the COA Board is to reopen nominations with a "clean slate" annually. **Nominees not selected in previous years are certainly welcome for consideration if renominated - in fact their renomination is encouraged.** For the present cycle, nominations will close on June 1, 2017, so as to allow ample time for deliberation before the convention.

By way of background, the *Neptunea* Award (Brunner, 2000; Lipe, 2000) was established at the midyear (1999-2000) meeting of the COA Board in order to recognize outstanding and distinguished service to conchologists and malacologists in recognition of:

1. Service to the Conchologists of America.

AND/OR

2. Service to the scientific interests of Conchologists of America.

AND/OR

3. Service to the science of Malacology as it applies to conchologists anywhere.

Although notable exceptions have been made, the COA Board, which serves as the jury for the *Neptunea* Award, has traditionally weighed its consideration for award recipients toward (1) amateurs: those not currently pursuing a principal career involving collection, study, or commerce of mollusks, (2) individuals "working behind the scenes" and relatively unrecognized in the COA world, for their contributions, and (3) active members of the COA. Up to three awards have been made at our annual conventions beginning with the Houston event in 2000 (see below). Nomination(s) for the *Neptunea* Award may be made by any COA member, and the format is simple:

Name of nominee:

This person deserves this award because (here a somewhat detailed paragraph will suffice.)
.... Signed ....

and either snailmail or email that nomination to the COA *Neptunea* Award Coordinator [currently me]:

Harry. G. Lee
4132 Ortega Forest Drive
Jacksonville, FL 32210 / shells@hglee.com]

Previous *Neptunea* Award winners:

2000 (Houston, TX): Ross Gunderson, Ben and Josy Wiener, Debbie Wills
2001 (Port Canaveral, FL): Emilio Garcia, Harry Lee, Lynn Scheu
2002 (Sarasota, FL): Richard Petit, Bernard and Phyllis Pipher
2003 (Tacoma, WA) Jim and Linda Brunner, Kevin Lamprell, Doris Underwood
2004 (Tampa, FL): Bobbi Houchin
2005 (Punta Rassa, FL): Richard Forbush, Anne Joffe, William Lyons
2006 (Mobile, AL): Jack Lightbourn, Betty Lipe
2007 (Portland, OR): none given
2008 (San Antonio, TX): Bill Frank, Archie Jones
2009 (Clearwater, FL) none given
2010 (Boston, MA): none given
2011 (Port Canaveral, FL): Alan Gettleman
2012 (Cherry Hill, NJ): Gary Rosenberg, Martin Avery Snyder
2013 (Sarasota, FL): David and Lucille Green, Marlo Krisberg, Charles Rawlings
2014 (Wilmington, NC): Colin Redfern, Tom Rice
2015 (Weston, FL) John and Cheryl Jacobs, Kevan and Linda Sunderland
2016 (Chicago, IL) Rich Goldberg, Homer Rhode, Charlotte Thorpe

Brunner, L., 2000. The *Neptunea* Award. *American Conchologist* 28(3): 3. Sept.
Lipe, B[etty], 2000. Presidents Message. *American Conchologist* 28(4): 2. Dec.

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Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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Book review of *The living and fossil Busycon whelks*: *Iconic mollusks of eastern North America* (Edward J. Petuch, Robert F. Myers & David P. Berschauer)
by Tammy L. Myers -- 43

Front cover: Three *Pleurodonte carocolla* (Linnaeus, 1758) climbing a tree in Puerto Rico. These large land-snails are probably about 60 mm in size. And yes, that is a rather oddly symetrical spacing on the tree. See the associated article by Matthew Blaine on page 4.

Back cover: *Amoria damonii* (Gray, 1864), cruising a rocky ledge off of Broome, Australia. There are two images of this species in the Rawlings article, but its colors are such that I [editor] thought it deserved an enlarged image. See the associated article by Charles Rawlings on page 10.

Editor's comments: Everyone should be aware by now that the 2017 COA Convention is 15-19 August in Key West, Florida (see page 40). This is shaping up to be a premier event. The locality is certainly unique. No other place is quite like Key West. It moves to a cadence all its own and we will be in the perfect spot to enjoy the Conch Republic. The Hilton Doubletree Grand Key Resort is a beautiful hotel with an atmosphere perfectly in tune with this part of the US. So okay, another COA convention. A chance to talk to old friends and meet new friends. A great locality for field trips and a beautiful hotel for presentations and dining. We all know, however, that it is shells that bring folks to these events. Several silent auctions, an oral auction, and the bourse – all offerings of those complex calcium constructs that first got us into conchology. So what about the shells? It just so happens that Donald Dan and a few others have been working overtime preparing a fabulous donated shell collection for this convention. The shells offered in this year's oral auction have a value that more than twice what we normally see for this event. Similarly, the silent auctions will be getting an influx of some really nice material.

Emily and Susan Weiss have donated the entire collection of very high quality shells accumulated by their father **Frederic Weiss**. As Donald Dan states, "The Key West oral auction will feature many extremely rare and highest quality shells from this collection. I am totally engulfed in shells, physically and mentally. Fortunately, it is shells, as I have no more other life. And they are FABULOUS SHELLS! It is like Christmas everyday."

Above: the truck load of donated shells. Below: COA President Harry Lee and Emily Weiss, trustee for the Frederic Weiss collection.

Surf and Turf – Puerto Rican style

F. Matthew Blaine (photos by the author)

In September of 2010, Alan Gettleman, Dona Blaine, and Matt Blaine took a shelling trip with Peggy Williams in and around Puerto Rico. Since we are all interested in both marine shells and land snails, the trip would be a mixture of both. Surf and turf would be on our adventure menu for the next few days!

Our plan was simple. We would leave from separate locations in the US, and fly to San Juan, where we would meet. Peggy would rent a car and guide us to the many locations she knew. We would eventually circumnavigate the entire island and also drive across the central inland area.

Fig. 1. Our first motel accommodations near the airport with decorative painted walls.

After landing, finding each other, and putting our bags in the automobile, we were off. We headed to our first accommodation, which was a very colorful one that Peggy had used on earlier trips (fig. 1). After moving into our rooms and getting settled, we put on our swimming suits and then got our masks and fins ready for our first marine diving experience in Puerto Rico. We would have a quick visit to a seashore park location called Escambron Beach, near San Juan. The area we swam in was protected by large rocks to break the waves hitting the ocean side and stirring up the water inside the protected area. One interesting thing that I saw while diving there was a flamingo tongue (*Cyphoma gibbosum* (Linnaeus, 1758)), that was not on a sea fan. It was the first time I had ever seen one not directly associated with a sea fan (fig. 2). There were plenty of sea urchins to make up for the absence of sea fans, however (fig. 3).

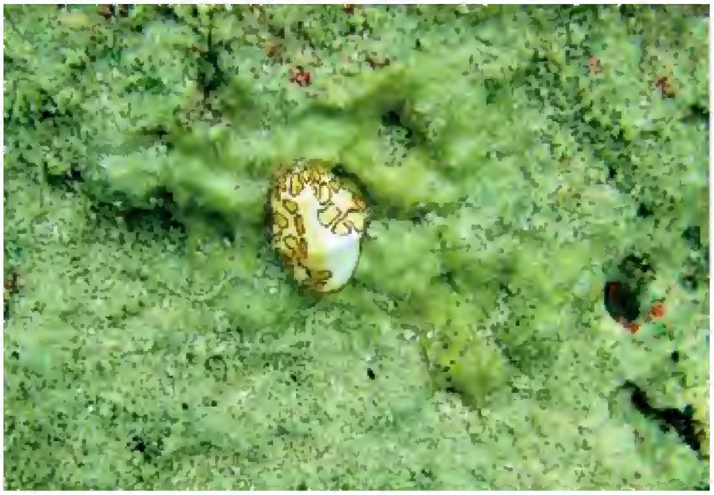


Fig. 2. Flamingo tongue, *Cyphoma gibbosum*, on a rock rather than the typical sea fan habitat.

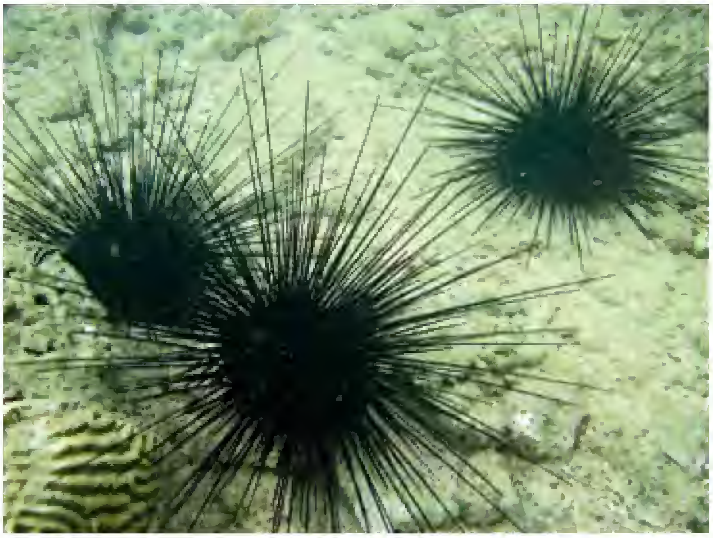


Fig. 3. Sea urchins with very long spines!

We then returned to our room where we would have a quick meal and get some much needed sleep. Dona and I were awakened shortly after getting to sleep by a chirping fire alarm. Apparently the battery needed to be replaced, so we got the manager. We discovered that he did not have a replacement battery and could not leave the front desk for fear of being robbed. The manager eventually put us in another room that had a good battery in the fire alarm. We were fortunate there was a room available! Not having the fire alarm randomly go off through the night made for a much more pleasant experience. All in all we liked the rambling, colorful, and friendly establishment. It added to our appreciation of the Puerto Rican adventure. In the morning we discovered that there was a full coffee pot of high octane Puerto Rican (rocket fuel) coffee with tiny cups for the guests to kick start our day.

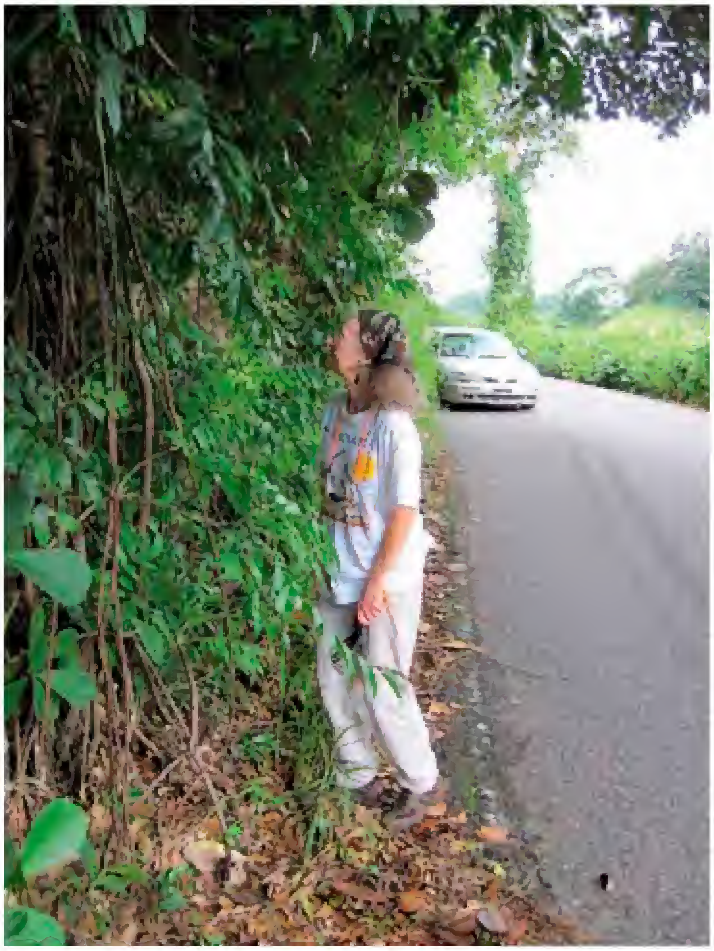


Fig. 4. **Dona checking through thick roadside vegetation for land snails.**

After coffee and cereal we headed off inland for our first full day of exploration and land snails. As we drove along we would stop and make a quick visual inspection to see if there were any snails in an area that looked promising and if there were any, we would spend some time looking (fig. 4). It is important to note that we would only collect dead, clean shells with no animals or soil whatsoever. As we progressed on our journey we stopped at a roadside vegetable and fruit stand to see what they had to offer and to purchase some baby bananas, which were sweet and delicious (fig. 5).

As the day went on we saw a tower peeking out above the tree line. It was part of the Arecibo Observatory. The observatory is home for the world's largest single dish radio telescope. It is used 24 hours a day, 365 days a year. The main collecting dish is 305 meters (1,000 ft.) in diameter, constructed inside the depression left by a karst sinkhole. It contains the largest curved focusing dish on Earth, giving Arecibo the largest electromagnetic wave gathering capacity. The dish surface is made of 38,778 perforated aluminum panels, each measuring approximately 3 by 6 feet (1 by 2 m), supported by a mesh of steel cables (figs. 6-7). To us, karst

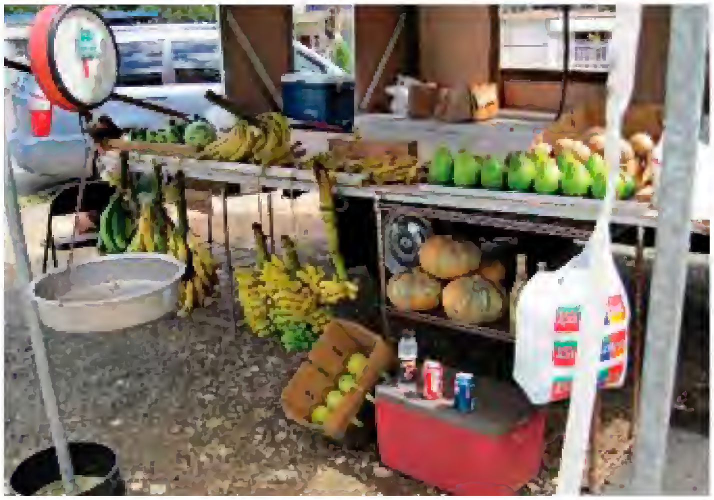


Fig. 5. The roadside stand where we purchased delicious bananas.

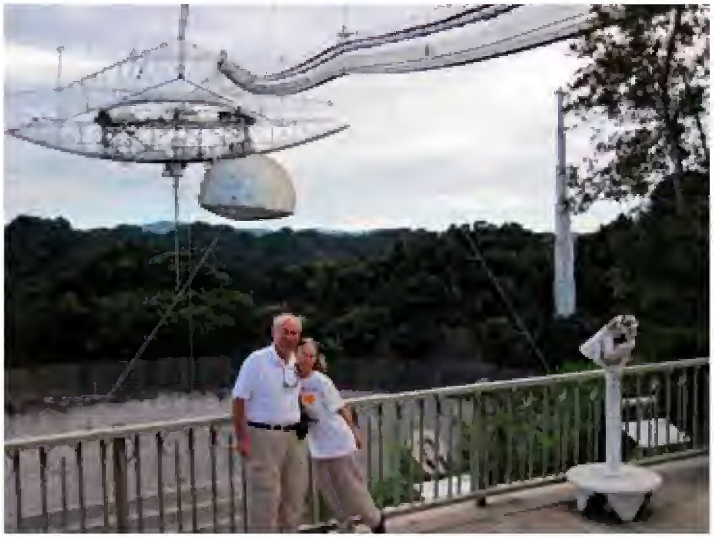


Fig. 6. The author and Dona at the Arecibo Observatory.

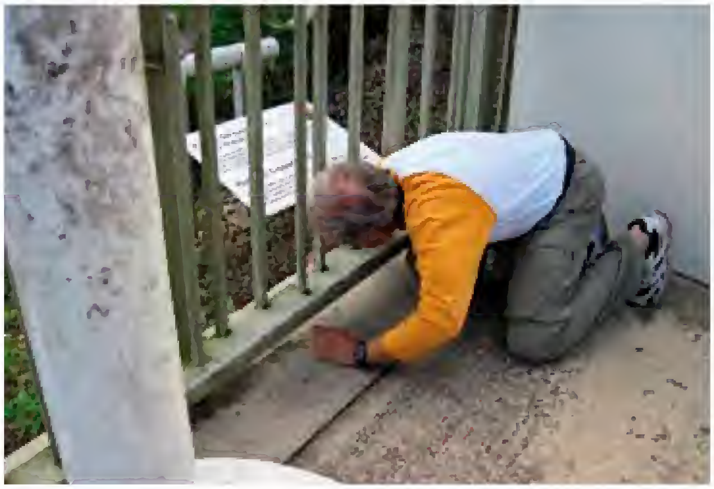


Fig. 7. Alan gets a closer look at the observatory sign and just by chance gathers a few wayward land snails.

Fig. 8. (L to R) Peggy, Matt, Dona, and Alan – after the first day of collecting, waiting for our pizza.

Fig. 9. Alan sorts through forest floor grunge looking for land snails while Dona and Olga (our host) look on.

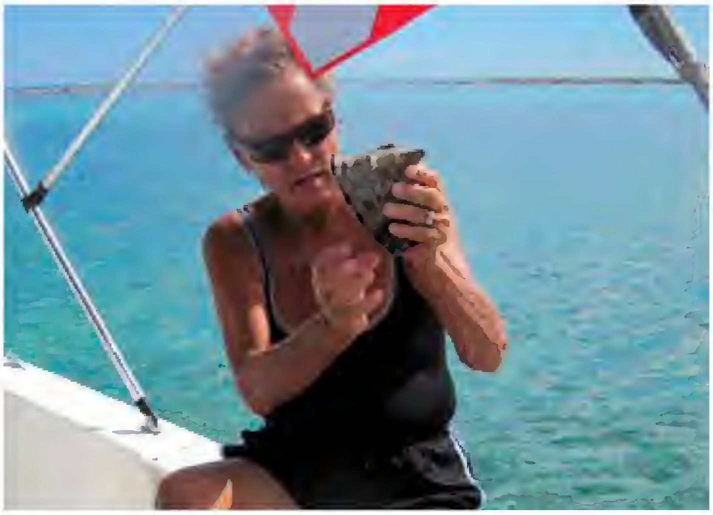


Fig. 10. Carmen Painter on her boat with a freshly caught king helmet (*Cassis tuberosa*).

Fig. 11. Carmen Painter's house on the water.

Fig. 12. The group waiting for the author to get out of the water.

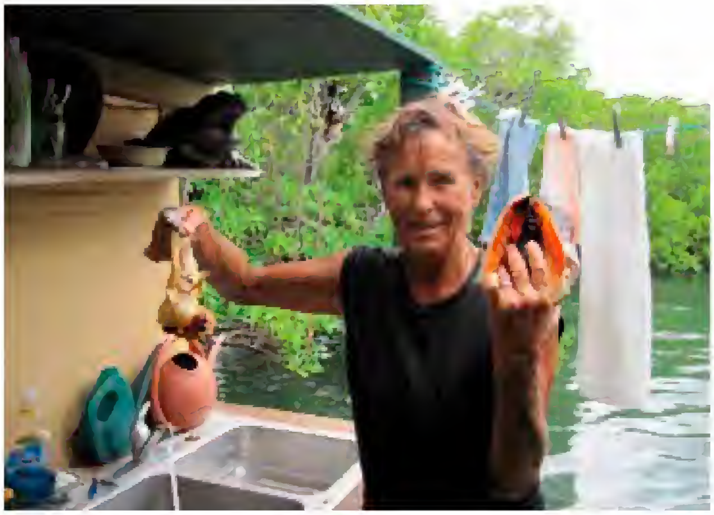


Fig. 13. Carmen demonstrates how to clean a helmet shell.

sinkhole means limestone and limestone means land snails! We discovered that Arecibo not only attracts radio signals but also a variety of endemic land snails!

After a great day of exploration on the land we needed to restore our electrolytes before enjoying a pizza dinner and a good night's sleep. The next day we would be off for a full day of salt water shelling experiences (fig. 8).

When we woke the next morning in our new accommodations we went up to the second floor porch where we found Alan hard at work sorting and cleaning some of the treasures he had collected the day before. Dona and Olga Irizarry, a retired school principal, shell collector, and our host, watched as Alan meticulously sorted and cleaned his previous day's catch (fig. 9).

We headed to the water to meet our guide for the day, Carmen Painter (fig. 10) who lives in a floating house on the water and has a shell business (fig. 11). The sky was blue and the water was clear. We were about to experience a great day of snorkeling with the current and moving the boat along with us as we went. Carmen dove down and pulled up the anchor by hand. She then drifted for a few hundred feet under water with the anchor in hand. Finally, as she passed us, she released it and re-anchored the boat. We all eased our way along with the current and explored the beauty below us. After hours of great snorkeling everyone was in the boat waiting for me go GET OUT of the water (fig. 12). We noticed a big dark cloud, which looked quite ominous, heading our way, so we cranked the engine up and headed toward Carmen's floating shell workshop. Captain Carmen was careful to circle around the approaching storm, avoiding it completely. Once we got to her floating shell workshop she showed us how she cleaned shells, including relaxing the animals out of helmet shells (fig. 13). After a long and delightful day of shelling we returned to Olga's place in La Parguera, for a good meal and sound sleep.

We left the calm waters of southwest Puerto Rico the next morning, heading up and around the west side via Route 2. Along the way we stopped at several beach communities to purchase shells. Peggy knew a diver near Cabo Rojo who used scuba in deep water to collect Triton's trumpet shells, *Charonia variegata*, which he sold. We stopped and made a few purchases, then continued north along the coast, stopping at interesting places along the way. Eventually we made it to Hobo Beach, which is on the north side of the northwest corner of the island. When we got there the tide was way out. The sight was fantastic (fig. 14). We parked the car and made our way down to the beach where we found large rafts of drift made up of thousands of perfect small shells (fig. 15). There were even some small *Epitonium* species in the mix, which I was keen on collecting. I helped Dona collect things to use on a mirror frame that she had been planning and only kept a few specimens for myself, which I would later find glued to Dona's craft project. Alan too was looking for specimen shells to add to his extensive collection. We all decided that Hobo Beach was definitely worth a return trip in the future.

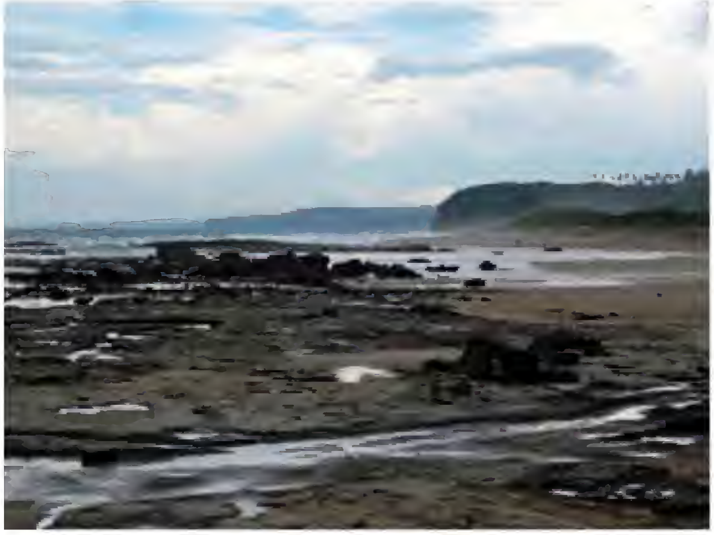


Fig. 14. Hobo Beach at low tide.

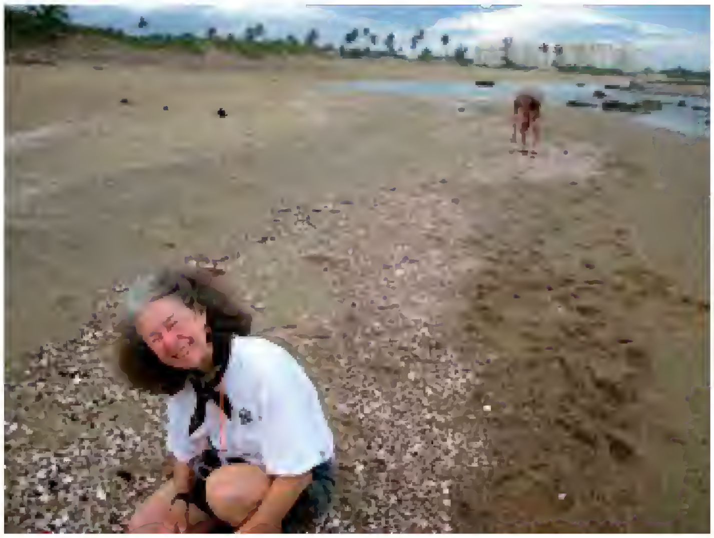


Fig. 15. Dona and Alan hard at work sorting through thousands upon thousands of tiny shells.

It was time to head back to Olga's for our last night in La Parguera before heading up around the east coast the next morning. On this leg of the adventure we would be exploring some small inland roads along the way (fig. 16). We were in a mountainous area where there was a narrow road along the mountain edge and houses were built with the front on the road and the rest of the house cantilevered in space. We would stop and see what land snails were in these wild areas along the way (fig. 17). We watched Alan risking life and limb by climbing over a precipice covered in vines and limbs for one of the rare green snails *Polydontes acutangula* (Burrow, 1815) (fig. 18). We continued to explore the mountains around the national forest, but we needed to

Fig. 16. A small inland road along the east coast.

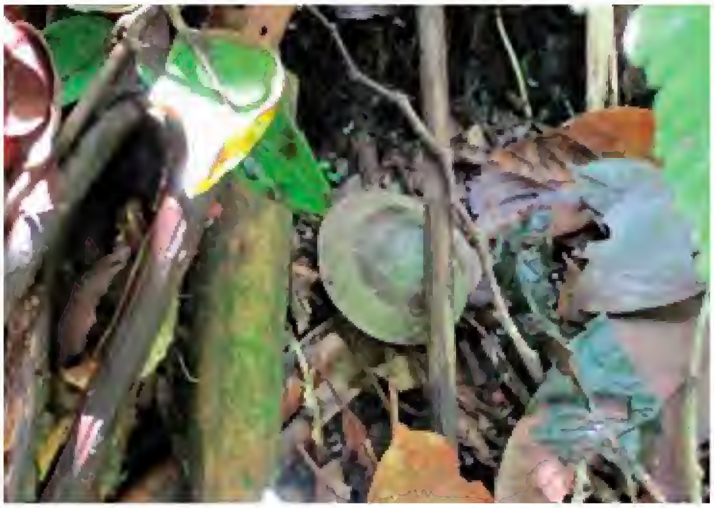


Fig. 17. An elusive green snail, *Polydontes acutangula*, hiding in amongst branches and leaf rubble.

Fig. 18. Alan risking life and limb for one of the rare green snails. *Polydontes acutangula.*

Fig. 19. Beach at the hotel near El Yunque National Forest – beautiful even without shells.

Fig. 20. One of the narrow paths in the rain forest that wind up and around the mountain.

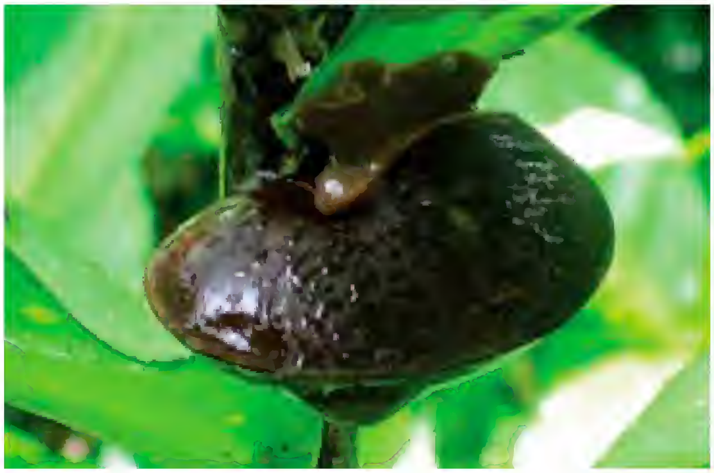


Fig. 21. *Pleurodonte carocolla* (Linnaeus, 1758), hanging on a leaf in the rain forest.

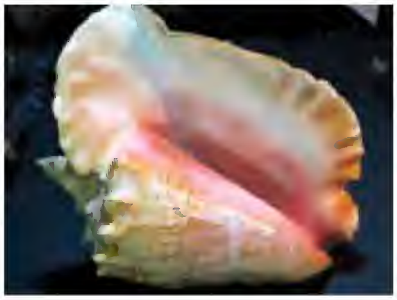
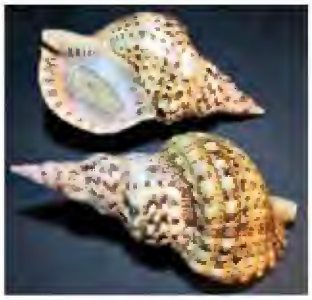


Fig. 22.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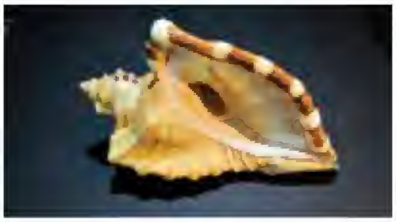
Fig. 24.

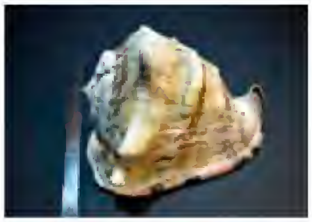
Fig. 25.

Figs. 22-25. Some of the marine shells that we encountered: 22. *Lobatus gigas* (Linnaeus, 1758), 23. *Charonia variegata* (Lamarck, 1816), 24. *Cymatium femorale* (Linnaeus, 1758), 25. *Cassis tuberosa* (Linnaeus, 1758)

find a place to spend the night. We had driven and collected until we were exhausted. Eventually we found a motel that had a few rooms vacant for the night. It was located on a beautiful beach. Finally after driving around for a while, we found a Subway Sandwich Shop that was still open where we purchased a delicious dinner.

Early the next morning we packed our suitcases for the flight home later in the afternoon. It was important to have everything in the suitcases packed and our carry-on backpacks ready for the airport. After that there was time for a short walk on the beach at the motel. While the beach did not have many shells, it was beautiful (fig. 19).

After packing the bags in the vehicle we were off for our first visit to El Yunque National Forest! The plan was to take photographs and explore for a few hours before leaving to drive a short distance to the international airport for our flights home. This was also our first visit to a rainforest and we were excited. We would not be disappointed.

El Yunque National Forest has excellent paved roads with fire hydrants all along the way. As one would expect in a rainforest, it was raining for much of the time. There are paved paths that wind up into the mountains (fig. 20). We knew that we would not have enough time to take the long paths, but we could explore while keeping a close eye on our watches. All around us there was life (fig. 21). We could hear the famous coqui frogs singing, but we never saw one in the wild. It was finally time to leave this beautiful place and head to the airport. Dona and I decided that we would return some day to El Yunque and give it the time that it deserved, but for now we needed to get to the airport.

As I was going through the check-in process I had to put my backpack on the conveyer belt so that it could go through the x-ray machine. Everyone else had passed through before me when suddenly an alarm went off. A beautiful young female TSA officer came over to me and asked me if I had any liquids in my backpack. I told her that I did not. She took my pack and ran it back through the machine again and once again the alarm went off. She then opened my bag and looked at the things that I had in it, which were mostly clothes. She came over to me and asked me if I was a retired professor. I was an assistant professor for 7 years and I was retired so I answered yes. She asked me if I was Henry Van Der Schalie. Now it just so happens that Henry van der Schalie (1907 – 1986) was Professor Emeritus of Zoology and Curator Emeritus of Mollusks in the Museum of Zoology, University of Michigan and I happened to have a copy of his book *The Land and Fresh-Water Mollusks of Puerto Rico* in my backpack. The book was published in 1948 when I was one year old. I didn't think that I looked that old as it would have made me 103!

I remembered that there had been an article in the paper a few weeks before, describing a retired professor who was stopped by TSA because he had a bunch of strange containers in his carryon. They closed down the airport for that one. It was eventually found that he was just continuing the experiments that he had been working on before he retired. I guess she thought that she had a similar situation on her hands. What had actually happened is that I had inadvertently left a bottle of Deep Woods Off in one of the pockets of my pack. We used insect repellant copiously to avoid mosquito bites, which at that time not only carried Malaria but also Dengue virus in Puerto Rico. The bottle did not have more than two ounces left in it but they confiscated it anyway. The good news was that they let me board the plane and I would now have time to read *The Land and Fresh Water Mollusks of Puerto Rico*.

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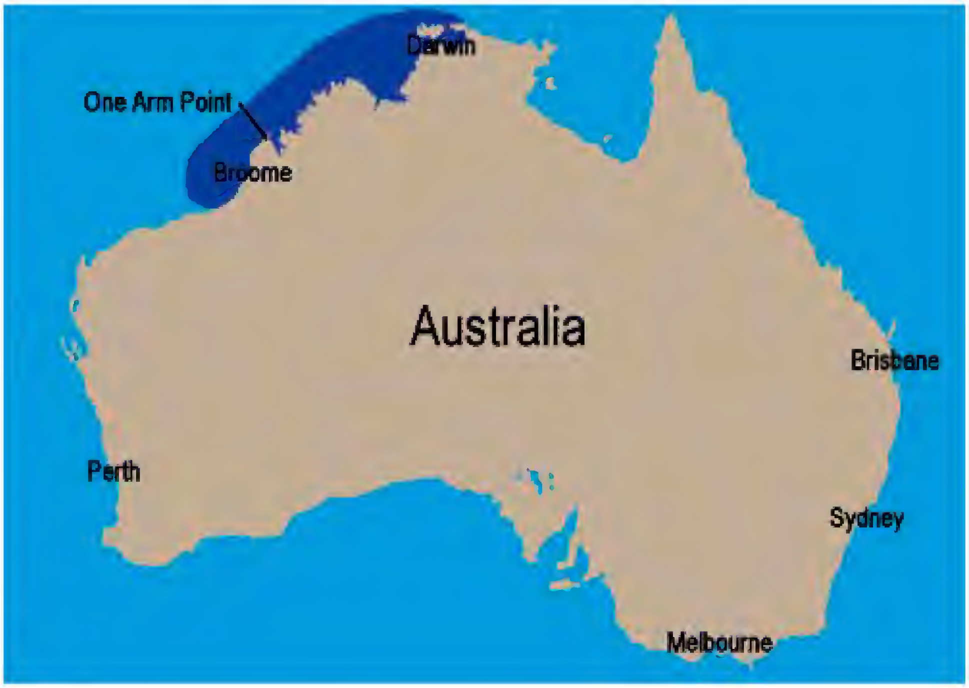
Into Bednall Country: The Land of the Tides

Charles E. Rawlings, M.D., J.D.



The presently recorded range of *Timbellus* (*Pterynotus*) *bednalli*.

Imagine a land where the tidal range is over 35 feet. Imagine a land where, at low tide, hundreds of square miles of rocky reef lay exposed. Imagine a land where an outgoing tide creates such whirlpools that they can drag a boat to the bottom. Imagine a land where the deadliest creature is a jellyfish; where the great white shark does not even make the list of the top ten most dangerous animals. Imagine a land where you are an item on the menu of crocodiles – some the size of small buses. Imagine an aboriginal land, the area north of Broome – One Armed Point, this is Bednall's Country. Venture at your own risk conchologists but that is the destination for any chance of finding the magnificent *Timbellus bednalli* (listed in older references as *Pterynotus bednalli*). Lynn Murphy, myself, and internationally acclaimed guide, Josh Akerman, did just that. What we found was exceptional.

After three months at sea on the *Ann Holtzberg*, William Tompson (WT) Bednall arrived in Adelaide, Australia. He was a few days shy of his fifteenth birthday and in three months he held a position at the Adelaide newspaper, *The Register*. In February 1865, WT married Maria Jane Mason, with whom he had six children. Around 1862, WT moved to Magill, and in 1874, he moved to Darwin, where he became editor of the newly created newspaper, the *Northern Territory Times*. WT Bednall had always been fascinated by shells, but his time in the Northern Territory expanded his interest exponentially.

WT Bednall lived in Darwin for approximately 3 years, between 1874 and 1877, at which time he moved back to Adelaide. During his time in Darwin, WT ran the *Northern Territory Times* as well as becoming the first to compile the earliest known translation of the Larrakia language, the original language of Larrakia, the traditional Aboriginal peoples of Darwin and the surrounding Northern Territory land. More importantly, WT Bednall was the first to discover both the murex and volute which currently bear his name – *Timbellus bednalli* (Brazier, 1878) and *Volutoconus bednalli* (Brazier, 1878). For conchologists, he is best known for these discoveries, two of the Holy Grails for shell collectors. After WT's discovery, Brazier quickly validated both his newly discovered finds as new valid species and they were subsequently described in the *Proceedings of the Zoological Society of London* in 1880 ("Descriptions of three species of marine shells from Port Darwin, Torres Straits discovered by W.T. Bednall; and of a new *Helix* from Kangaroo Island, South Australia by Angas, George French"). Since their discovery, both species have been listed as rare and are highly sought after by collectors.

Over the years, the known range of Bednall's murex has gradually enlarged as a result of intrepid explorers and collectors. Currently its range is limited to north and west Australia from perhaps the region of Broome to Darwin. It is not a common shell and is most commonly found in some of the most dangerous marine environments in the world – the Land of the Tides. As a result, this is where Josh Akerman makes his appearance. Josh is not only a true Australian explorer, but also probably the world's expert on finding Bednall's murex. When I decided to photograph a living Bednall's murex he is the collector I contacted. He is the best of the best!

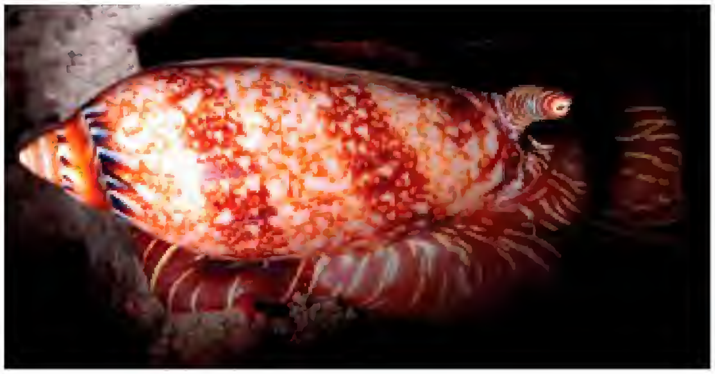
Landing strip leading into Bednall's Country.

To travel to prime *T. bednalli* habitat, the itinerary reads like this: Charlotte to Los Angeles, Los Angeles to Sydney, Sydney to Perth, Perth to Broome, single engine Cessna from Broome to One Arm Point (thusly named for the sharks that will remove one arm out of two if you dip them in the water), and finally a boat ride of about an hour over water teeming with crocodiles to an uninhabited island. It is on this island, where ancient sandstone and basaltic ledges are exposed by the huge spring tides, that certain murexes are located. In addition, under these ledges are found *Timbellus bednalli*. Oh and by the way, these tides that expose the shells occur only about 12 days out of the year. So good luck finding them! Of course we had our secret weapon, Josh. To illustrate, over the course of an hour diligently searching, I could find one – Josh found nine. At that point he merely walked by a ledge and, in doing so, he absently pointed to this same ledge, which was about 50 feet in length, and commented that there was a *T. bednalli* under it. Moreover, I could have it if I could find it – if not I sucked as a *T. bednalli* collector. Yes, I finally found it, my small one measures about 72mm; the one from under the ledge measures about 80mm. My partner, Lynn, found other species but couldn't locate a *T. bednalli* – they are not easy to spot. The next day on the AM tide, Josh found a total of 12 – I was saved from any further humiliation for I was busy photographing living *T. bednalli*! I digress though, back to the beginning.

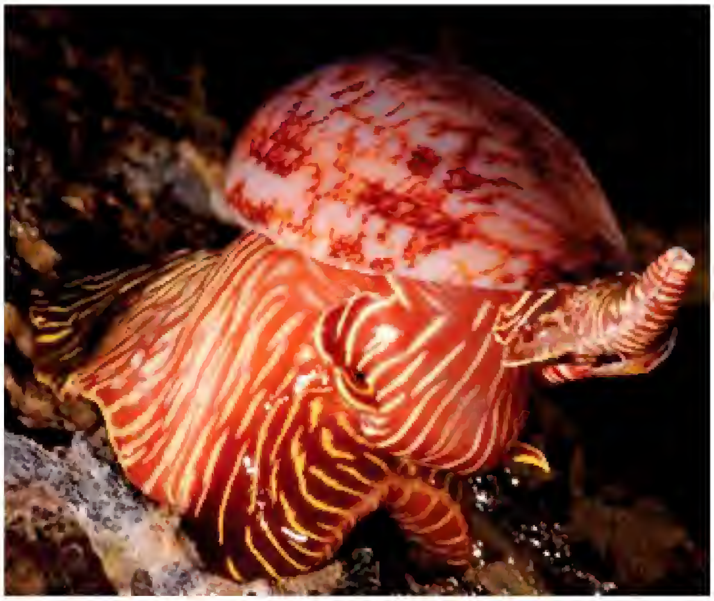
Aerial photograph of the beautiful coastline on our Cessna flight from Broome. The area is characterized by mangrove swamps, white beaches and rugged cliffs.

Aerial photograph of a likely island habitat for Bednall's murex. Notice the cliffs, ledges, and reef platform – all of which are exposed during the giant tides of spring and fall.

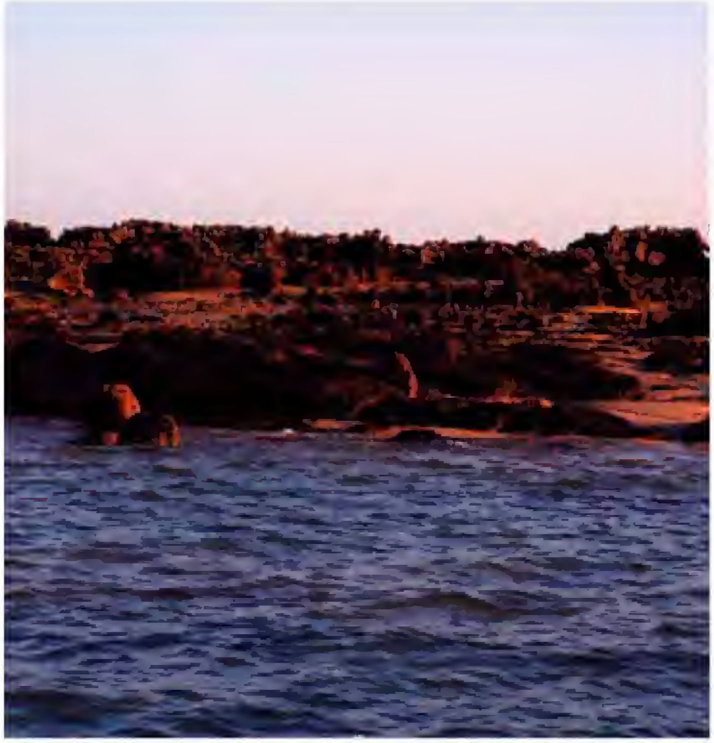
Western Australia is known for its enormous tidal fluctuations, and Broome, is no exception. These tidal fluctuations occur during the spring and fall seasons and can vary by almost 35 feet from minus tide to high tide – over 12 meters. At the low water mark, in Broome, a vast expanse of mud and sand bars is exposed. From these emerge a plethora of sand dwelling species including volutes.



Above and below: *Amoria damonii* in situ. This has always been a shell I thought particularly good looking, but add the animal and it is really striking! [ed. note: see the back cover for a magnified view of this volute].



Wreck of one of the flying boats of Broome. These are exposed during the extreme low tides of spring and fall. Past them, further to sea, is a sandbar that yielded *Amoria damonii*, amongst other species.



This is Bednall's murex habitat. Both above water, exposed at extreme low tide, and under the water, these volcanic ledges may yield beautiful "Butterfly shells" within their folds.

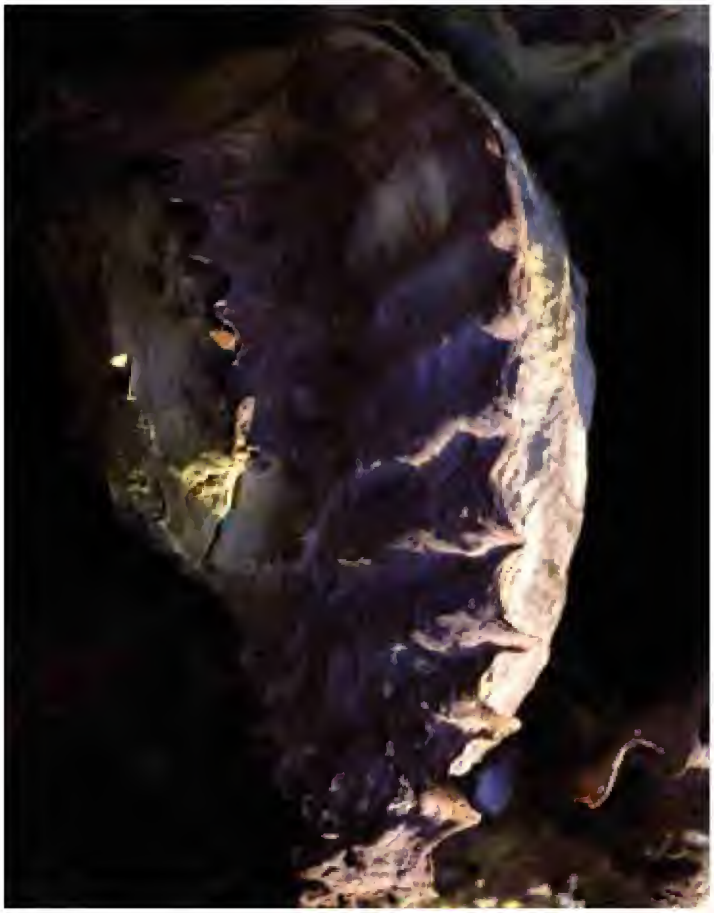
In addition, at extreme low tides, the wreckage of several flying boats emerges. These are vintage WWII planes downed by the Japanese. When these wrecks are exposed, the volutes come out to play.

We struggled to sleep that first night in Broome, knowing that we would need to begin our trek behind the low tide waters at 4:30 AM. We awakened at 4 AM and accompanied by Josh, we began the approximate mile and a half trek to the water's edge. We plodded through sand bars, ankle deep mud, and more firm sand, punctuated by swiftly moving rivulets of tidal flow. We continued to walk into a glorious sunrise when finally the wrecks of the flying boats came into view. Then, miraculously, the volutes began to appear. Not one, not two, not ten, but dozens of *Amoria damonii* (Gray, 1864). Caught up in photographing them I ignored the other tuns, olives, murex, and giant Australian trumpet shells emerging all around us. Lynn and Josh did not; they collected specimens of a multitude of species, including a beautiful Australian trumpet, *Syrinx aruanus* (Linnaeus, 1758). At that point the tide began racing in and we headed towards the distant shore. At one point, there was some discussion of discarding the 20 pound shell, but Lynn persevered. The trumpet made it back safely. Now, we were headed north to Bednall's country.

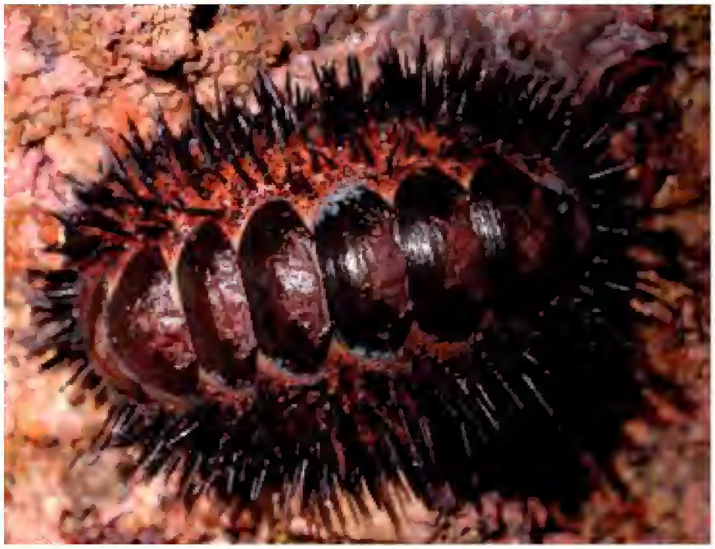
The Kimberley region is desolate, nothing but scrub and red earth for miles and miles. It appears even more desolate from 5,000 feet inside a small Cessna (our transport up to One Arm Point). This is Bednall's country and we landed in Aborigine land on Monday afternoon. We drove to our tents (only about 120˚F inside), unloaded our equipment and immediately headed back to board our boat. Josh, being the consummate professional guide, had arranged for his friend to meet us. We were off to explore the ledges that constitute Bednall's habitat during the extreme low tides of fall. I have never, ever, experienced a boat ride like that one on Monday evening. The tide was turning, the current was at least 16 knots and at one point the boat was caught in a whirlpool and was traveling sideways. The passage looked like a devil's cauldron. I saw at least one standing wave of 8 feet or more. You ask – was it worth it? Yes indeed, on that very first evening we found Bednall's murex! It took me only two slabs to find a juvenile. I left it in the hopes of supplementing the breeding population. We explored Bednall's habitat over the next several tide exchanges. Suffice it to say that we found quite a number. In addition, I was able to photograph the living animal. Interestingly it is a pale yellowish-white with small brown spots. These exploits were detailed earlier in this paper, I just need to emphasize that without Josh Akerman all our efforts would have been in vain!

During our last night at One Arm Point, due to circumstances beyond our control, we found ourselves without a boat. What to do? Let's go cross a crocodile-infested mangrove swamp and tidal inlet searching for *Chicoreus cornucervi* (Roding, 1798)! *C. cornucervi* is one of my favorite shells so I was totally excited. When Josh said: "Let's form a daisy chain by holding hands to cross this inlet." I was a bit perplexed. Hmmm. The current wasn't unmanageable, about 4 knots; the depth was only up to our waist, but when Josh said: "Just letting you know, large crocodiles have been known to frequent these waters." I became somewhat apprehensive. I figured that the daisy chain would provide a meal for the crocodiles, as in the slowest person! On the other hand, as soon as we crossed the tidal flow, I found my first *C. cornucervi*; then another and then tens and then hundreds. They were laying eggs in the *Halimeda* algae. A murex lover's dream. OK, so the mud was ankle to knee deep and the fear of crocodiles was ever present, the shells were still *C. cornucervi*. We had our pick from hundreds. I also saw blue-ring octopus, an unnamed red octopus, plus *Melo amphora* and multiple other shell species. To put it in perspective, my largest *C. cornucervi* was approximately 130mm and pure black. The next day we flew back to Broome.

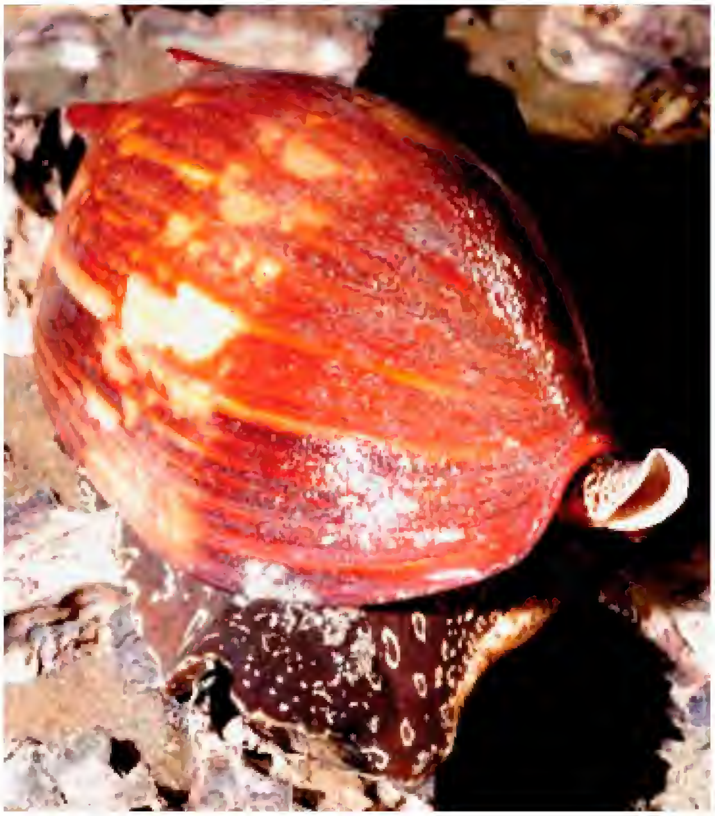
Before we make our way back to Broome, just a brief aside as to the morphology of Bednall's Murex. Why the wings? What is the purpose of these magnificent frills? Observing them in their native habitat, several hypotheses spring to mind. First and foremost, they provide hydrodynamic function and stability to the shell during those times of great current flow vis-à-vis the huge daily tidal fluctuations. Sec-



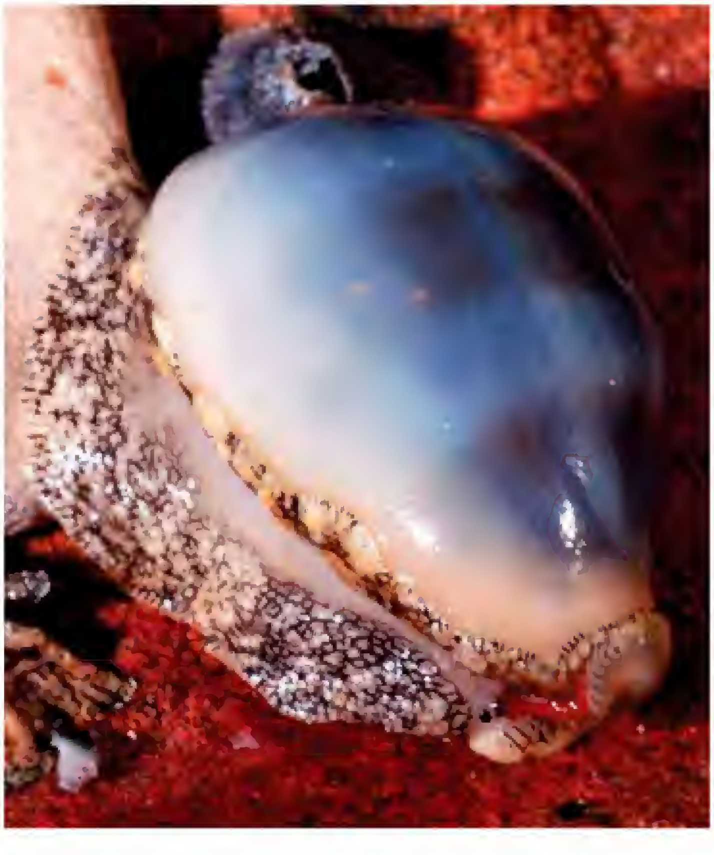
Thousands of these oysters line the rocks in the murex's habitat. One theory is that Bednall's murex has developed their "wings" to mimic the oysters. Another is that their "wings" provide hydrodynamic fluidity so that they can withstand the water pressure generated by the huge tidal exchanges.



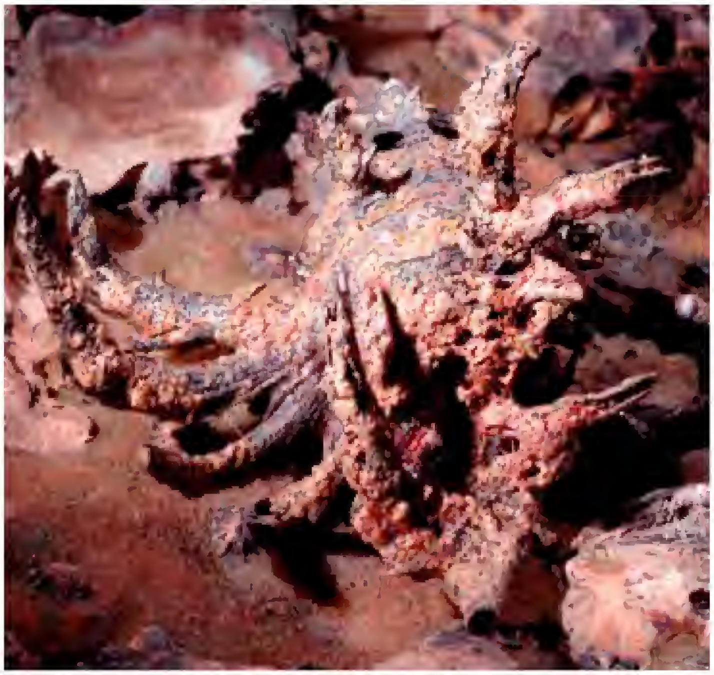
Acanthopleura spinosa **(Bruguière, 1792), an unusual chiton species found in conjunction with Bednall's murex.**



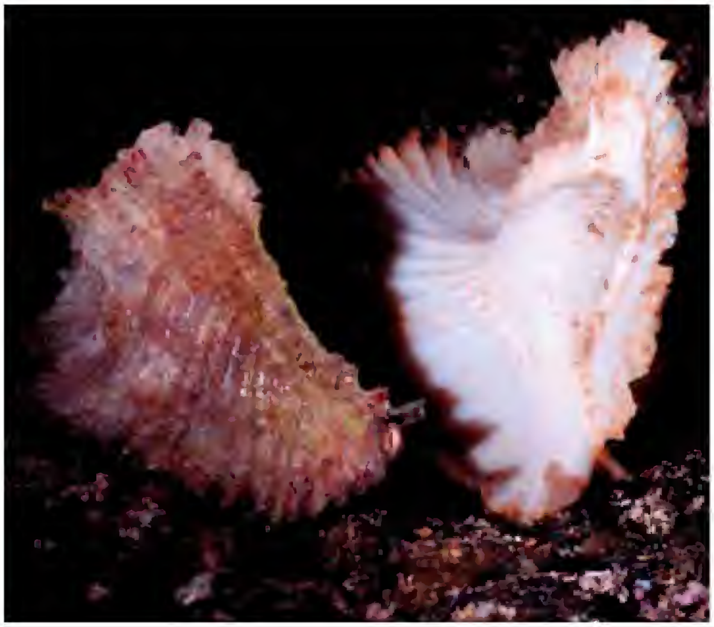
Melo amphora **calmly cruises the rocks along the cliff face.**



A highly sought after cowrie color form – the Broome blue. *Erronea errones* f. *azurea* (Schilder, 1968).



Chicoreus cornucervi **in dire need of cleaning, but even covered in mud this is a great looking shell.**

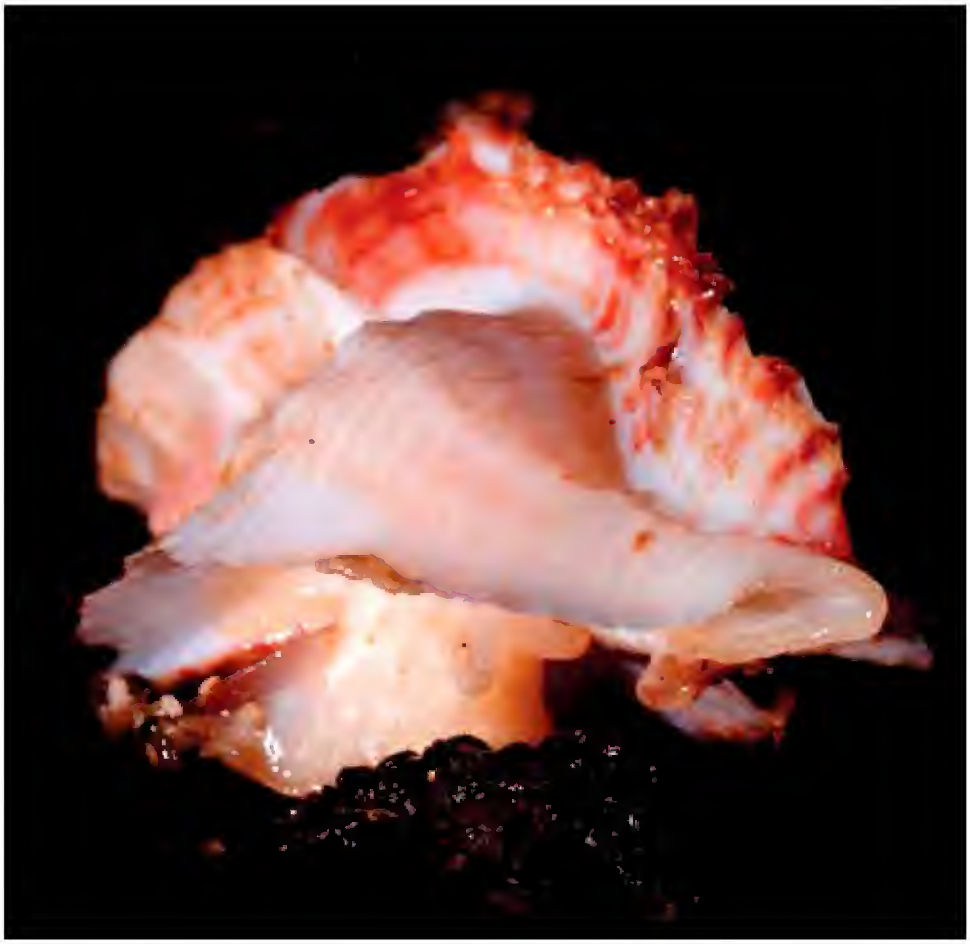


A pair of Bednall's murex in their native habitat.

ond, they provide a form of mimicry vis-à-vis the thousands of frilly oyster shells found in their native habitat. From a hydrodynamic outlook, these frills would direct and funnel the water flowing across the shell in such a way that they are not displaced from the secure rocky perches. Typically, they are located under volcanic rocky ledges from 3 to 30 feet deep. The frills would funnel the water in such a way that they could remain secure in their rocky habitat. In addition, if they somehow become covered in sand, these frills would provide sufficient surface area such that they could quickly climb out of the suffocating sand. With regard to the second theory, murex eat bivalves. These frills on the Bednall's species imitate the oysters found all around them. Could this be a means of camouflage as they slowly approach their oyster dinner? Or do both the oyster and the Bednall's murex use the same morphological adaptation to their advantage during the massive tidal fluctuations? From a realistic viewpoint, both hypotheses are probably moot since both are partially true. Regardless, the frills provide the beauty of the murex. The function is secondary to the conchologists who want one for their collection. That being said, to be truthful, the vast majority of Bednall's murex have an imperfect frill at least on one side! My theory is that it demonstrates the violence of the tidal exchange and current!

We flew the same small Cessna from One Armed Point into Broome. Taking off from that red dirt runway was just as exciting as landing on it! Once back in Broome, we concentrated on finding several species that had eluded us over the last several days: *Melo amphora* (Lightfoot, 1786), *Hexaplex stainforthi* (Reeve, 1843), *Chicoreus rubiginosus* (Reeve, 1845), and cones – especially *Conus victoriae* (Reeve, 1843). I was also concentrating on photographing the living animals of all these species. Over the next several days and nights we were able to find, and I was able to photograph, almost all the species we had on the list. I was especially lucky to find and photograph a Broome blue cowrie (well, thanks goes to Josh for that one) as well as the *Melo*. I was also able to find and photograph the orange version of *Chicoreus rubiginosus*. In addition to the orange/golden form I was successful in finding chocolate, white, pink, and almost black color forms. *Hexaplex stainforthi* was no longer elusive and on our last night *Conus victoriae* was abundant in the small tidal pools left by the massive low tide. There were thousands of small tidal pools containing melos, tiger cowries, and other species. More importantly, almost each one held a *C. victoriae*. The color forms ranged from the typical tented pattern to melanistic to pale with pink stripes. All of us were happy after that evening, even though we did bog down in the dunes afterwards!

So, how do we conclude this article? First, kudos to Josh Akerman. If you dream of finding Bednall's murex, fly to Broome and hire him. If you want the best specimens of them, call, email, or Facebook him; he has remarkable skills and a remarkable collection. The land of the tides did not disappoint. I was hoping for a few more species of volutes, but the ones I found were exceptional. Being a devout murex enthusiast, I was thrilled to find all the murex species. I was overwhelmed by the *C. cornucervi* and thoroughly enjoyed watching them lay eggs. The shells, once cleaned, are amazing. Of course, one of my Holy Grails was a living Bednall's murex. I was enthralled to find them in their native habitat and to have the animal emerge for photographs. For the experience of a lifetime, travel to Broome and the Kimberley. You won't be disappointed!



Photograph of a living *Timbellus bednalli* (Brazier, 1878) animal.

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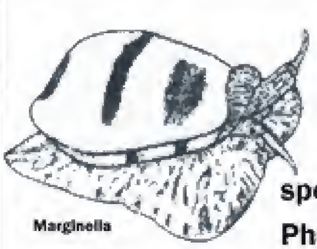

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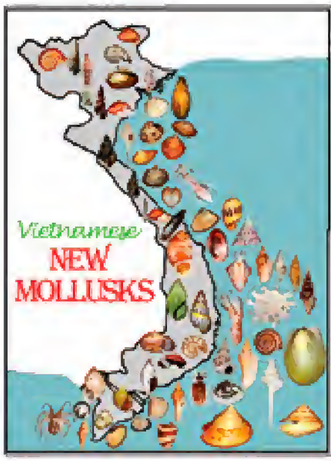

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SCUM XIX: Southern California Unified Malacologists

Lindsey T. Groves

Attendees at SCUM XX

Top row: (l to r): John Alderson, Mary Stecheson, Hessam Ghanimi, Jaymes Awbrey, Craig Hoover, Chris Everett, Emile Fiesler, Phil Liff-Grieff, Debbie Kunath, Keith Thompson, Britt Leatham, Kim Coombs, Kyle Sirovy, Newton Hood, Shawn Wiedrick, Doug Eernisse.

2nd row: (l to r): Anna Dutra Clark, Pat Don Vito, Bob Abela, Austin & Jo Hendy, Sabrina Medrano, Jenny McCarthy, Haleh Golestani, Clara Jo King, Chuck Powell, Ángel Valdés, Lance Gilbertson, Eric Ostrowski, Joshua Rodriquez, Bryan White.

3rd row: (l to r): Carole Hertz, Jules Hertz, Jann & Nadia Vendetti, Jere Lipps, Sarah Siren, Bob Stanton, Hans Bertsch, Lawrence Moser, George Kennedy, Lindsey Groves.

Bottom row: (l to r): Carol Stadum, Scott Rugh.

Present at SCUM XX but not in photo: Dave Goodward, Zach Lefevre

The 20th annual gathering of **S**outhern **C**alifornia **U**nified **M**alacologists (SCUM) was held at the Laguna Hills Community Center, Laguna Hills, CA, for the second consecutive year and was attended by 44 professional, amateur, and student malacologists and paleontologists on Saturday, January 30th, 2016. This informal group continues to meet on an annual basis to facilitate contact and keep attendees informed of research activities and opportunities. As always, in keeping these gatherings informal, there are no dues, officers, or publications. The continuing success of informal groups such as SCUM, Mid-Atlantic Malacologists (MAM), Ohio Valley Unified Malacologists (OVUM), and FUM (Florida Unified Malacologists) will hopefully encourage more regional groups of malacologists and paleontologists to meet in a likewise manner.

SCUM XX host Sarah Siren greeted pre-meeting attendees with a variety of pastries, fresh fruit, coffee, tea, and juices. Around 9:00 AM Sarah welcomed the group and made several announcements. As this was the twentieth gathering of SCUM, charter members in attendance were acknowledged including, Hans Bertsch, Pat Don Vito, Lindsey Groves, Carole & Jules Hertz, and George Kennedy.

In continuing SCUM tradition all present were given the opportunity to introduce themselves and give a short update about current mollusk related activities. Most presentations were informal but ten attendees gave more detailed talks. Fourteen students from three universities were in attendance; seven mentored by Doug Eernisse (CSUF): six by Ángel Valdés (CPP): and one by Patrick Krug (CSULA). Student attendees Haleah Golestani (*Aplysia*), Sabrina Medrano (Sacoglossans), Jenny McCarthy (Juliidae), and Craig Hoover (*Doriopsilla*) presented informative talks. There was also an update by Lindsey Groves on the progress made on Jim McLean's northeast Pacific shelled-gastropod identification guide since SCUM XIX. Numerous SCUM have volunteered to write chapters for the tome including Ángel Valdés (shelled opisthobranchs), Pat LaFollette (Pyramidellidae), Daniel Gieger (Vetigastropoda), Doug Eernissee (Hipponicidae, Capulidae, Siphonariidae, and Patellogastropoda), Jann Vendetti (Buccinidae with Roger Clark), Shawn Wiedrick (*Ocinebrina*), and Lindsey Groves (Cypraeoidea and Velutinidae).

Other talks of particular interest included a presentation by biological consultant Emile Fiesler (BioVeda) who summarized the biogeography of the introduced freshwater gastropod *Melanoides tuberculata* (Müller, 1774) since its introduction into southern California in 1972 in Riverside County and since collected in Laguna Niguel, Orange County, Palos Verdes Peninsula and Lincoln Park, both Los Angeles County. This species, which outcompetes native species for food and space, is native to North Africa and Southeast Asia. He also noted that he collected several specimens of unknown *Pomacea* from the Palos Verdes Hills. Shawn Wiedrick summarized his molluscan endeavors since SCUM XVIII including his current research on the gastropod muricid genus *Ocinebrina* in California and micro-turrid genera and species of the tropical Indo-Pacific. New NHMLAC Invertebrate Paleontology collection manager Austin Hendy presented a short talk on the recent changes in the section since Mary Stecheson's retirement and his plans for the future of LACMIP. Jere Lipps (Cooper Center director) made an impressive presentation about the progress made to improve the John D. Cooper Archaeological and Paleontological Center as the premier repository for specimens and artifacts in Orange County. Once again Doug Eernisse (CSUF) reported on the myriad of projects he has in progress singly and with co-authors both professional and student.

SCUM XXI will be hosted by Doug Eernisse at the Cooper Center, CA, in January of 2017.

SCUM XX participants and their respective interests and/or activities:

Bob Abela (San Diego Shell Club): Formerly a volunteer at the museum with Carole and Jules Hertz, has recently relocated to Guam.

John Alderson (Nat. Hist. Mus. L.A. Co., Invert. Paleo.): Research Associate currently working on invertebrates of the Miocene Conejo Volcanics with Bob Stanton. Also revising the Pectinidae section of a review of the Miocene fauna of the Topanga Formation of southern California.

Jaymes Awbrey (Calif. St. Univ., Los Angeles): Recently graduated and continues research on sacoglossan sea-slugs.

Hans Bertsch (San Diego Shell Club): Continues with research on Hawaiian, Californian, and Sea of Cortez nudibranchs.

Anna Dutra Clark (Los Angeles, CA): Recently relocated to southern California and has an interest in land snails.

Kim Coombs (Calif. St. Univ., Fullerton): Graduate student in Doug Eernisse's lab.

Pat Don Vito (San Diego Nat. Hist. Mus.): Volunteer at the museum in the Invertebrate Paleontology section. She also brought in a large Cretaceous gastropod with oysters and *Spondylus* attached for identification … possibly a fasciolariid or volutid.

Doug Eernisse (Calif. St. Univ., Fullerton): Currently has a myriad of chiton research projects including *Cyanoplax* as a free spawner vs. a brooder, *Chaetopleura* and first report of the genus as a brooder, *Chitonina* and mitochondrial DNA sequences, chitons and limpets from Japanese docks set adrift by tsunamis in 2011, and new species of *Ferreirella* from off Big Sur, CA. He also co-led a chiton workshop in Coquimbo, Chile, with Russian colleague Boris Sirenko. All of this in addition to teaching duties.

Chris Everett (San Diego Nat. Hist. Mus.): Fossil preparator for the paleontology department.

Emile Fiesler (Bio Veyda): Conducts biological surveys with an emphasis on Mollusks and Arthropods. Made presentation on the introduced freshwater gastropod species *Melanoides tuberculata* and an unknown species of *Pomacea* in southern California.

Hessam Ghanimi (Cal. Poly Pomona): Graduate student researching the pleurobranch genus *Berthella* and its phylogeny.

Lance Gilbertson (Newport Beach, CA): NHMLAC Malacology Associate researching land snails with Doug Eernisse.

Haleah Golestani (Cal. Poly. Pomona): Undergrad researching several species of *Aplysia* using mitochondrial and molecular gene sequencing.

Dave Goodward (Grand Terrace, CA): Research interest in the landsnail genus *Helminthoglypta* with Lance Gilbertson.

Lindsey Groves (Nat. Hist. Mus L.A. Co., Malacology): Continues as collection manager at NHMLAC. Research interest in fossil and Recent cypraeoideans and their biogeography and biostratigraphy. Currently working with Daniel Muhs (USGS Denver) on Pleistocene marine terrace chronology and sea-level changes on the California Channel Islands and with Richard Squires (CSUN, retired) on the fossil invertebrate taxa of paleontologist William More Gabb.

Writing Cypraeoidea and Velutinoidea chapters for Jim McLean's NE Pacific monograph.

Austin Hendy (Nat. Hist. Mus. LA Co., Invert. Paleo.): Collection Manager of Invertebrate Paleontology at NHMLAC with an interest in fossil mollusks from Panama and northern South America and their taxonomy and biogeography. Also researching the Pleistocene formations of the Palos Verdes Peninsula, California.

Carole Hertz (San Diego Nat. Hist. Mus.): Volunteers at the museum in the Invertebrate Section and is currently working on the type collection. Long-time editor of the San Diego Shell Club publication *The Festivus* … now retired.

Jules Hertz (San Diego Shell Club): Retired business manager of *The Festivus.*

Newton Hood (Cal. St. Univ., Fullerton): Graduate student with Doug Eernisse.

Craig Hoover (Cal. Poly Pomona): Recent graduate. Researching pseudocryptic diversity in *Doriopsilla* species complex in California and Baja California, Mexico.

George Kennedy (Brain F. Smith & Associates): Conducts environmental monitoring in San Diego County, particularly Pleistocene and Eocene aged strata.

Clara Jo King (Cal. Poly. Pomona): Grad student researching *Phidiana hiltoni.*

Debbie Kunath (Cal. Poly Pomona): Grad student in Geological Sciences, a consulting geologist, and shell collector.

Britt Leatham (Cal. St. Univ., San Bernardino): Interest in Recent and fossil gastropods.

Zach Lefevre (Dudek, Encinitas, CA): Works with Sarah Siren at Dudek. Honorary SCUM member.

Phil Liff-Grieff (Pac. Conch. Club): Collector of landsnails with an interest in island biogeography. Frequent iNaturalist participant particularly with landsnails.

Jere Lipps (Cooper Center): Recently re-retired from directorship of the Cooper Center. Presented a summary of many of the projects and objectives of the center with regard to Orange County fossils and anthropological artifacts.

Jenny McCarthy (Cal. Poly. Pomona): Graduate student, currently researching the sacoglossan family Juliidae

Sabrina Medrano (Cal. Poly. Pomona): Graduate student, currently researching shelled sacoglossans Oxynoidae and non-shelled sacoglossans of the family Pleurobranchidae.

Lawrence Moser (Pac. Conch. Club): Current club Vice-President. Interested in all mollusks.

Eric Ostrowski (Cal. St. Univ., Fullerton): Graduate student with Doug Eernisse.

Chuck Powell, II (U.S. Geological Survey): Now retired from the USGS and continues to research Neogene mollusks from Alaska to the Gulf of California. Has particular interest in the Imperial (Miocene/Pliocene), San Diego (Pliocene), Purisima (Miocene), Niguel (Pliocene), and Santa Barbara (Pleistocene) formations.

Joshua Rodriguez (Cal. St. Univ., Fullerton): Graduate student researching limpets with Doug Eernisse.

Scott Rugh (Temecula, CA): Paleo consultant and currently preparing a manuscript on the paleontology of the late Pliocene San Diego Formation.

Sarah Siren (Dudek, Encinitas, CA): Successor to Carol Stadum at the Laguna Hills Community Center. Conducts paleontologic consulting for Dudek.

Kyle Sirovy (Cal. St. Univ., Fullerton): Graduate student researching chitons with Doug Eernisse.

Carol Stadum (Carlsbad, CA): Former paleontologist at the Laguna Hills Community Center who created the current exhibits. Continues to research Miocene mollusks of the Orange County area.

Robert Stanton (Nat. Hist. Mus. L.A. Co., Invert. Paleo.): Research Associate currently working on invertebrates of the Miocene Conejo Volcanics with John Alderson.

Mary Stecheson (Cooper Center): Volunteers at the Cooper Center.

Keith Thompson (Beaumont, CA): Retired with a research interest in freshwater gastropods.

Ángel Valdés (Cal. Poly. Pomona): Teaches Evolutionary Biology and continues phylogenetic research on opisthobranch gastropods of the Caribbean and Panamic provinces.

Jann Vendetti (Nat. Hist. Mus. LA Co., Malacology): Twila Bratcher Chair in Malacological Research at NHMLAC. Researching sacoglossans and land snails and slugs as part of SLIME (**S**nails and slugs **L**iving **I**n **M**etropolitan **E**nvironments) for the Urban Nature Research Center at NHMLAC. Current Western Society of Malacologists President preparing for 2017 meeting in Los Angeles. Daughter Nadia is the youngest SCUM attendee (see group photo).

Bryan White (Calif. St. Univ., Fullerton): Graduate student with Doug Eernisse.

Shawn Wiedrick (Calif St. Univ., Fullerton): Current President of the Pacific Conchological Club and interested in all areas of shell collecting. Published two papers in the new *Festivus* on Indo-Pacific micro turrids. Shawn has also returned to grad school and is attending California State University, Fullerton, to study ocinebrine gastropods for a Master's degree.

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Malacology Section
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The Nylander Museum - Caribou, Maine

Sheila L. Nugent

The Nylander Museum, Caribou, Maine.

A large bronze caribou, namesake for the city Caribou, Maine.

Despite having collected freshwater mollusks for many years in the rivers and lakes of Maine, I had never made it to Maine's largest and northernmost county, Aroostook. While researching my collections, I began to notice articles in *The Nautilus* referring to freshwater species from northern Maine by a naturalist named Olof O. Nylander. My interest began to focus on the man and I found out that there was a museum in Caribou devoted to him and his collections. Caribou is not on the way to anywhere except Fort Kent and Canada, and easily a seven hour drive from southern Maine, but a trip to Caribou was long overdue and the museum was calling.

I planned my trip north over a weekend because the museum is only open from 1-3 on Saturday and Sunday. To insure that I would not miss the window of visitation, I left a phone message indicating my planned trip. To my surprise I received a quick call back from a Mr. Nelson Ketch regarding my visit. I soon learned that Olof Nylander was his great grandfather and that he had recently been asked to serve on the governing board of the museum. I was interested in seeing the collection of Lymnaeidae snails from the Fish River system and Mr. Ketch assured me that I would have access to this collection.

So the trip began on a Saturday morning. I spent the day driving and stopping on the way at a few lakes to do some collecting. Since it was August and still warm, I planned on camping in Presque Isle, a small city nearby Caribou. Arriving around 3:00 PM, I set up camp overlooking the Aroostook River and to my delight, caught the last day of the "Crown of Maine Balloon Festival" and was treated to a sunset aerial display of hot air balloons. On Sunday morning I decided to explore before going on to Caribou. The Aroostook State Park was nearby and a visit to the oldest state park in the country was a great way to begin my day. I was able to collect some specimens of mussels, snails and pisidium clams in nearby Echo Lake outside the park confines, and visited several small ponds and streams on my way to Caribou.

The whole time I was driving and preparing for my museum visit, I kept wondering what more I could find out about Mr. Nylander. I had read a few things online, and I knew that he was a Swedish immigrant who had a keen eye and interest in the natural world. He had been a child who would bring sea shells back to his home as play things. He was an explorer of the nearby forests and fields, finding land snails and unusual rocks and minerals to collect. As a youth he spent time in the museums of Stockholm, studying their natural history collections, before following his brothers to

The United States. Having apprenticed as a painter in Sweden he continued this vocation in America, spending time in Boston, Rhode Island, New York, and Florida. In the winters he became friends with professors at 'The School of Technology,' 'Harvard College,' and 'Yale College,' where he spent his spare time studying their collections. There were no funds for a formal education, so he taught himself. This is also when he began traveling to Maine and the Caribou region, collecting fossils and mapping geological outcroppings. For a time he worked for The US Geological Survey as a field collector. Settling in Woodland, Maine, he and his wife raised 2 children. It was said by family members that they remember Olof taking his walking stick and heading out into the woods to explore. He spent time with friends and colleagues canoeing and collecting snails, fossils, and plants in the Fish River and its chain of lakes. He was a expert on the Devonian fossils of Maine and Maine's wild orchids.

I arrived early at the corner of Main and Nylander streets in front of a modest white clapboard building, which houses the Nylander Museum. Mr. Ketch was early as well. I received a warm welcome and knew right away this was more than a visit to a museum, this was a personal tour into a man's life and passions seen through the eyes of his great grandson.

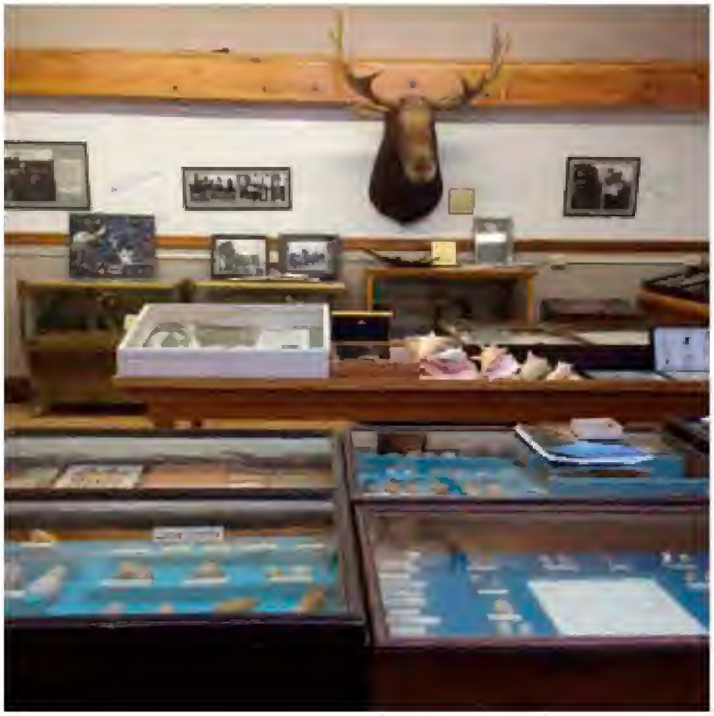
We started with a tour of the current museum offerings that are on public display and were overseen by a wax figure of Olof Nylander at his desk who kept constant vigil by the front entrance. There are two rooms of exhibits, the north and south galleries. The south houses the extensive mineral and fossil exhibits as well as some marine mollusks. The north side has a blend of Native American artifacts, mounted animals, and butterflies, some having been donated to the museum. In this room there are also several cases of early mollusk collections mounted on cardboard, which were the displays that Mr. Nylander used as teaching tools when visiting local schools. A case of Cuban land snails stands out, obtained through a trade with Dr. Miguel L. Jaume of Havana, with a hand written letter to Olof dated 1933. A case of world-wide land snails is also quite impressive. Information on native orchids that were also studied and written about by Mr. Nylander can also be found here. Between the two rooms are books and copies of Nylander's papers available to the public.

After viewing the main floor, I got to go behind the scenes to the enormous amount of material stored in the basement. To see original hand written labels on specimens collected in the early 1900's was an honor. This is the real heart of the museum. Being given the chance to see the Lymnaeidae that were collected from nearby streams and lakes was what I had come for and to get such a sense of whom Olof Nylander really was. I was amazed that this man had collected so extensively and hope that these additional items

I camped along the picturesque Aroostook River.

Sunset display of hot air balloons from the last day of the "Crown of Maine Balloon Festival."

Olof Nylander (1864-1943) and a few fossil specimens he collected.



The north gallery.

The south gallery.

Cuban land snails with the letter from Dr. Jaume.

A tray of assorted landsnails.

Some of Nylander's teaching aids.

will become future exhibits. Over the years he shared his findings with other scientists whose friendships he gleaned as a young man in Boston and New York. He was also able to trade for new specimens to add to his collection. There are boxes and cabinets full of paper archives in storage as well. Everywhere you look there are artifacts, shells, rocks, fossils, and cabinets full of fresh and marine shells awaiting their debut in the museum proper.

The timing of my visit was perfect as there have been recent changes. The current building was built in 1938 under the Works Progress Administration. In 1939 the Museum was dedicated and the collections that had previously been stored in the Caribou High School where Nylander had a work room, were moved into the musuem. Mr. Nylander served as the first curator until his death in 1943. His collections had been donated to the City of Caribou and upon his death the city took over as curator of the museum, which was a department within the city government. Although the collections remained in the current building, over the years the space was shared with the city as a recreation hall, a USO, and most recently the Chamber of Commerce. Now that the Chamber of Commerce has become regionalized, the whole building is dedicated to the Nylander collections.

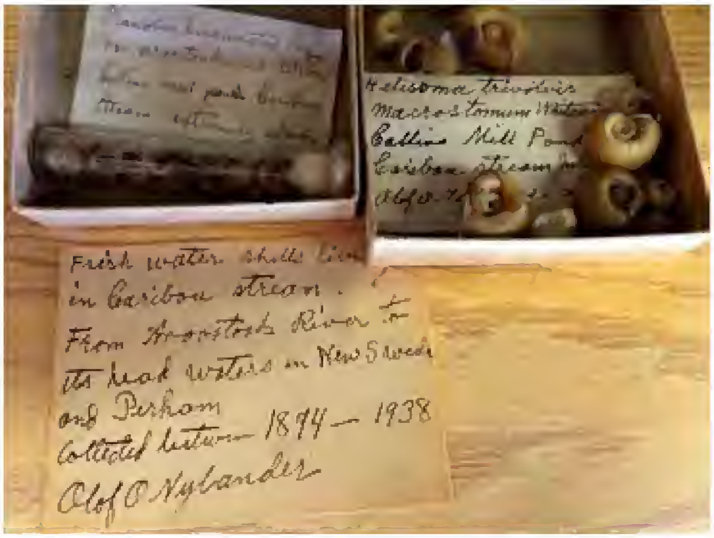
With new space and new enthusiasm, the Museum Board has room to bring more exhibits up from the basement storage area and build additional matching cabinets. There is also a plan to categorize the collections with a museum computer program. They have lots of work ahead of them. Time was running out for my visit but I still had lots more to see, so I accepted Mr. Ketch's offer to return on Monday for more exploring and also to meet with the Board President, Mr. Kimber Noyes.

I left the Museum with 3 hours of sunlight remaining and decided to head north from Caribou to Madawaska Lake and Cross Lake, two lakes mentioned in Olof Nylanders papers. The access to Madawaska was a modern boat ramp with rocky fill. I found nothing. The access to Cross Lake was two miles down a dirt road to a ramp area where I was able to find dead examples of *Elliptio complanata* and *Pyganodon cataracta*, also some snails that I have not yet identified. Access to lakes is much different today than in the 1800s, there are private property concerns to deal with and few public access points. Traveling back to the campground, two large moose ran across the road, but I was driving and couldn't get a picture. I was just glad they didn't run into me.

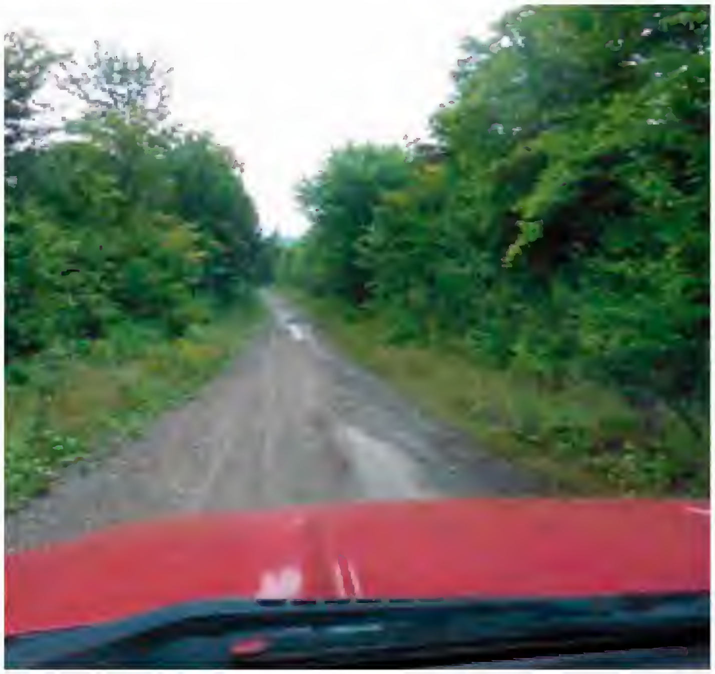
On Monday I returned to the museum and met with Mr. Noyes, who was as enthusiastic about the new direction of the museum as was Mr. Ketch. We talked about the current exhibits and I actually made a few suggestions and offered help if needed. I finished getting the information I had come for and then took a tour of the countryside with Mr. Ketch. We went by the Caribou stream and

A wax figure of Olof Nylander (sitting). Nelson Ketch is behind Nylander in the dark t-shirt and Nylander Museum Board President, Kimber Noyes is on the right.

Basement storage of collection items that just do not fit into the display area.



Original notations by Nylander on locally collected fresh-water snails.



Access to Nylander's original collecting sites was often restricted by private property and limited road access.

Collins Pond, two of Olof's favorite collection sites. Recent rains had swelled the stream so it was difficult to get access for collecting. We visited the Woodland site of Nylander's home with beautiful fields of wildflowers and a huge cottonwood tree planted by Olof himself. His home is no longer standing, but the family retains ownership of the property. A visit to his nearby grave to pay respect was humbling. We spent several more hours driving to some of the lakes that had been surveyed by Nylander. A few specimens of freshwater mussels were obtained at Lake Matawaska and I do believe Nelson Ketch enjoyed looking for shells.

All In all it was a very pleasant and informative afternoon. I said goodbye and made my way back to camp with increased knowledge and insight into the life of Olof O. Nylander. Many museums are just collections of things. Here in Caribou is the story of a man and his passion for nature. I would spend the trip home doing further collecting and knowing that I had made new friends in Caribou and that I would return..

Olof O. Nylander worked with notable scientists of the time, including Professor H. A. Pilsbry, Professor P. F. Baker, Professor Edward L. Morse, Mr. Alexander Longfellow, Dr. Bryant Walker, Dr. V. Sterki, Paleotologists H. S. Williams, John M. Clarke, and more. Prior to his death, The University of Maine bestowed upon him an honorary Master of Science Degree for his accomplishments and contributions to the natural history of northern Maine.

Several fossil species and snails have been named for him, including:

Phacopidella nylanderi (Clarke 1907) [Devonian trilobite]
Prorensselaeria nylanderi Raymond, 1923 [Upper Silurian-Middle Devonian brachiopod]
Macroporaster nylanderi Raymond, 1921 [Devonian sea star]
Pisidium pauperculum nylanderi Sterki, 1898 [freshwater Sphaeriidae]
Vertigo nylanderi Sterki, 1909 [landsnail]
Valvata sincera nylanderi Dall, 1905 [freshwater snail]

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www.cariboumaine.org

www.mainememory.net

COA *Neptunea* Award

Many of us are beginning plans for the 2017 COA Convention in Key West, FL. One of the many events on the agenda is the annual COA *Neptunea* Award(s), and it is my privilege to call for nominations.

The consensus of the COA Board is to reopen nominations with a "clean slate" annually. **Nominees not selected in previous years are certainly welcome for consideration if re-nominated – in fact their re-nomination is encouraged.** For the present cycle, nominations will close on June 1, 2017, so as to allow ample time for deliberation before the convention.

By way of background, the *Neptunea* Award (Brunner, 2000; Lipe, 2000) was established at the midyear (1999-2000) meeting of the COA Board in order to recognize outstanding and distinguished service to conchologists and malacologists in recognition of:

1. Service to the Conchologists of America.

AND/OR

2. Service to the scientific interests of Conchologists of America.

AND/OR

3. Service to the science of Malacology as it applies to conchologists anywhere.

Although notable exceptions have been made, the COA Board, which serves as the jury for the *Neptunea* Award, has traditionally weighed its consideration for award recipients toward (1) amateurs: those not currently pursuing a principal career involving collection, study, or commerce of mollusks, (2) individuals "working behind the scenes" and relatively unrecognized in the COA world, for their contributions, and (3) active members of the COA. Up to three awards have been made at our annual conventions beginning with the Houston event in 2000 (see below). Nominations for the *Neptunea* Award may be made by any COA member, and the format is simple:

Name of nominee:

This person deserves this award because (here a somewhat detailed paragraph will suffice.)

.... Signed ....

and either snailmail or email that nomination to the COA *Neptunea* Award Coordinator:

Everett Long
422 Shoreline Dr.
Cedar Point, N.C. 28584-7204
nlong3@earthlink.net

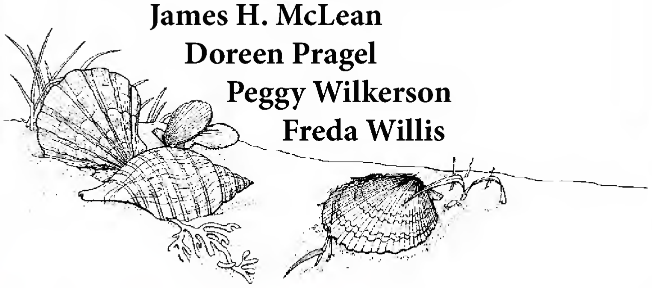
Previous *Neptunea* Award winners:
2000 (Houston, TX): Ross Gunderson, Ben and Josy Wiener, Debbie Wills
2001 (Port Canaveral, FL): Emilio Garcia, Harry Lee, Lynn Scheu
2002 (Sarasota, FL): Richard Petit, Bernard and Phyllis Pipher
2003 (Tacoma, WA) Jim and Linda Brunner, Kevin Lamprell, Doris Underwood
2004 (Tampa, FL): Bobbi Houchin
2005 (Punta Rassa, FL): Richard Forbush, Anne Joffe, William Lyons
2006 (Mobile, AL): Jack Lightbourn, Betty Lipe
2007 (Portland, OR): none given
2008 (San Antonio, TX): Bill Frank, Archie Jones
2009 (Clearwater, FL) none given
2010 (Boston, MA): none given
2011 (Port Canaveral, FL): Alan Gettleman
2012 (Cherry Hill, NJ): Gary Rosenberg, Martin Avery Snyder
2013 (Sarasota, FL): David and Lucille Green, Marlo Krisberg, Charles Rawlings
2014 (Wilmington, NC): Colin Redfern, Tom Rice
2015 (Weston, FL) John and Cheryl Jacobs, Kevan and Linda Sunderland
2016 (Chicago, IL) Rich Goldberg, Homer Rhode, Charlotte Thorpe

Brunner, L., 2000. The *Neptunea* Award. *American Conchologist* 28(3): 3. Sept.

Lipe, B[etty], 2000. Presidents Message. *American Conchologist* 28(4): 2. Dec.

In memoriam:

Eloise Boynton Bosch
Deborah Freeman
Ken Matthys
(William) Henry McCullagh, Jr.
James H. McLean
Doreen Pragel
Peggy Wilkerson
Freda Willis



Donald & Eloise Bosch

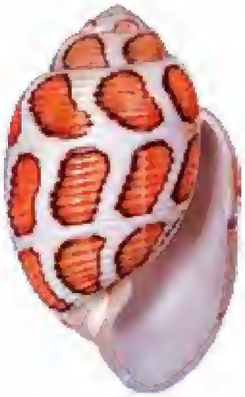
Eloise Bosch lived her retirement years in her beloved Oman with her late husband, Dr. Donald Bosch, who always said the prettiest shell (*Punctacteon eloiseae* (Abbott, 1973)) was named after the prettiest lady he knew. She spent her working life in Oman as a teacher at the Al Amana Mission School in Muscat, teaching in both Arabic and English.

Eloise was born in Mohawk, New York, on August 4, 1919, and was the oldest of 4 children. She grew up in New York City and attended Hope College in Holland, Michigan. She graduated with a B.A. as a teacher. She was fortunate to become very close friends with her future sister-in-law who insisted that she had a wonderful brother that Eloise must meet. They ended up married for 70 happy, adventurous, loving years. During World War II, while Donald was in the US Army in Europe, Eloise graduated from Union Theological Seminary in New York City with a master's degree in religious education.

Eloise and Don arrived in Muscat, Oman, in January 1955 by British India Steam ship with their three small children, David, Paul and Bonnie. They came to the Middle-East as missionaries under the Reformed Church of America and had spent three years in Amara, Iraq, studying Arabic. They would continue their mission work until their retirement with Donald working as a doctor and Eloise as a teacher. Upon their retirement in 1983, His Majesty Sultan Qaboos awarded them Omani nationality and provided them with a home in Haramel, in recognition of their many years of service to the people of Oman. They would subsequently spend half the year in the United Stated with family and friends and the other half in their much loved Oman.

Eloise was a gifted teacher and loved the children she taught. She once said that she was "...humbled to have played a small part in the lives of these children, as some have become bankers, principals in girls' schools, some are now in the Ministry of Education and the Ministry of Social services. Yet others have become artists and arrange art exhibits. Some boys and girls have been trained to be nurses and medical assistants. Yet others have served in the army and navy. Some married ambassadors and served in other countries and some became involved in local charities."

Both Eloise and Don became collectors of seashells as a result of the family's weekend visits to the local beaches, where they noticed the many shells on the shore. This began their love affair with the world of conchology. Donald would be recognized as an expert on seashells of the Arabian Gulf and authored several books on shells of that area - Eloise would be his helpmate and partner. The shell books included: *Seashells of Oman, Seashells of Southern Arabia, and Seashells of Eastern Arabia.* In 2000, Eloise and Donald co-authored a book about their early lives in Oman, *The Doctor and the Teacher*, *Oman 1955-1970.* Donald and Eloise, often with the help of their children and grandchildren, discovered over 20 new species of seashells in Omani waters. One of the most beautiful shells they discovered was later named *Punctacteon eloisae* after Eloise.



Debbie Freeman

Deborah Jane Freeman was married 34 years to Glenn. She worked in an emergency room and neonatal ICU, later becoming a private detective with shotgun certification. In Virginia she built a log home on a mountain. In Englewood, Florida, Debbie expanded SW Great Dane Rescue and volunteered at Suncoast Humane Society. She mastered many crafts, including cake decorating (with many designs published), beekeeping and bee rescue, quilting, stained glass, and genealogy (published), as well as seashell art (including award winning sailors' valentines) and she judged several shell shows, but her passion was conchology. Debbie won awards for the study and display of deformed shells. She held two board positions with COA, was the only three term president of the Englewood Shell Club, and started their newsletter. When the COA Membership Director was forced to step down due to declining health, Debbie immediately volunteered. Her own declining health never affected her ever-present humor and enjoyable dry wit.

Joyce & Ken Matthys

Ken Matthys loved teaching others about shells, whether they were young or old. He really loved giving shells to children and he thoroughly enjoyed sharing his shell collecting knowledge with participants attending the Road Scholar programs on Sanibel during the winter. It seemed only appropriate to place his cremated remains in one of his large Florida horse conchs for burial. Both Ken and Joyce have been extremely active in both local shell clubs and COA. Ken was quite knowledgeable about shells, yet was always able to listen attentively to others. An all-to-uncommon trait in folks who really know a subject.

(William) Henry McCullagh Jr., MD FACC

By Harry G. Lee

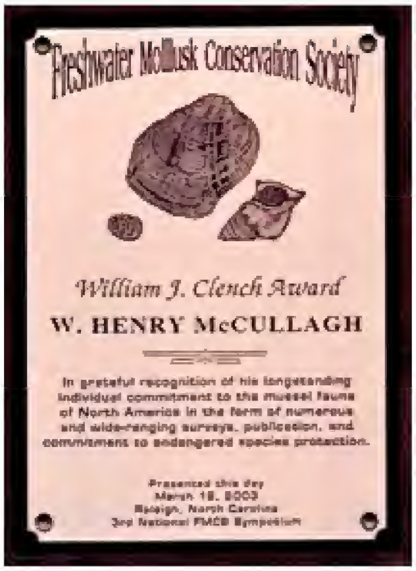
Henry was my partner in medical practice and a fellow naturalist before then, a period spanning nearly half a century. While his passion for the naiads of the American southeast was unsurpassed, he was equally happy diving in the Florida Keys, plying the waters of Vancouver Sound aboard his *La Pescadora*, birding in South America, or landsnailing in the Smoky Mts. - almost always accompanied by his wife, Lenore, who shared his love of the outdoors.

Henry McCullagh

After graduating first in his class from Emory University Medical School, he continued his training at Grady Memorial Hospital in Atlanta, GA, where I first made his acquaintance. He polished his enviable comprehension of cardiology under the tutelage of Drs. J. Willis Hurst, Eugene Braunwald, and John Ross, among the foremost authorities in the field. In 1972, he and Lenore moved back to the Jacksonville, FL, area, where he entered private practice.

His reserved, even taciturn, demeanor belied a very active and inquisitive mind and wry sense of humor. He was a raconteur in the tradition of the Old South, which one might expect from a sixth generation Floridian. Public mien notwithstanding, he compulsively chronicled every one of his hundreds of field trips in bound logbooks, which span a meter (his preference over the foot/pound system) on his shell-room bookshelf.

Henry was a deft field collector and keen taxonomist. He contributed to the formal literature, e.g., McCullagh *et al.* (2002), and was recognized for his achievements by Freshwater Mollusk Conservation Society [FWCS; see below]. Typical of Henry, he attended the ceremony, in NC, with some reluctance and only on the condition that he not "give a speech." His request was honored.



Freshwater Mollusk Conservation Society

William J. Clench Award

W. HENRY McCULLAGH

In grateful recognition of his longstanding individual commitment to the mussel fauna of North America in the form of numerous and wide-ranging surveys, publication, and commitment to endangered species protection.

Presented this day
March 18, 2003
Raleigh, North Carolina
3rd National FMCS Symposium

Williams (2014: 15) wrote "Since retiring, McCullagh continues to pursue regional mollusks, which has resulted in a computerized collection of about 3,500 lots of freshwater mussels and about 1,500 lots of freshwater and land snails. Hundreds of duplicates have been deposited in the FLMNH [Florida Museum of Natural History] and the OSU [Ohio State University] Museum of Biological Diversity in Columbus. In 2003 McCullagh was given the William J. Clench Memorial Award by the FCMS **[R]** for outstanding contributions to malacology, including his significant collections of aquatic mollusks."

Henry's collection will go to the FLMNH at the University of Florida, Gainesville, where some portions of it, used in monographs on AL and FL mussels (Williams *et al.*, 2008, 2014), already repose.

Henry McCullagh made his mark as a Southern Naturalist; he will be missed by many kindred spirits whose lives he enriched. He wished that his ashes be spread on the Chipola River in western Florida, near where his pioneer ancestors settled and he often returned in pursuit his beloved pearly mussels.

McCullagh, W.H., J.D. Williams, S.W. McGregor, J.W Pierson, and C. Lydeard. 2002. The unionid (Bivalvia) fauna of the Sipsey River in northwestern Alabama, an aquatic hotspot. *American Malacological Bulletin 17*(1-2): 1-15. <http://biodiversitylibrary.org/page/45999789>

Williams, J.D., A.E. Bogan, and J.T. Garner. 2008. *Freshwater mussels of Alabama and the Mobile Basin in Georgia, Mississippi, and Tennessee.* University of Alabama Press, Tuscaloosa. xv + 1-908. Review: <http://www.jaxshells.org/pdfs/atmb.pdf>

Williams, J.D., R.S. Butler, G.L. Warren, N.A. Johnson. 2014. *Freshwater Mussels of Florida*. University of Alabama Press, Tuscaloosa, AL. [i]-xv + 1-498.

James H. McLean

by Lindsey T. Groves

James H. McLean

It is my sad malacological duty to report that former LACM Malacology curator James H. McLean passed away last Friday, November 11th at age 80. Jim joined the museum staff as curator of Invertebrate Zoology in 1964, whilst completing his PhD at Stanford under Myra Keen. He worked to build the IZ section into what would become the world-class sections of Crustacea, Echinoderms, Polychaetes, and Malacology. Jim traveled extensively worldwide to build the mollusk collection and obtained several NSF grants to house the growing collections. Along with LACM Ichthyology curator emeritus Bob Lavenberg, Jim helped to acquire the vast Alan Hancock Foundation and the UCLA collections. He published over 100 peer reviewed papers in major malacological journals, described over 300 molluscan taxa, and was honored by colleagues who named at least 27 species for him. He retired in 2001, but continued his daily routine of research until 2014 when his declining health started to take its toll. Jim's career goal to produce a monograph of the shelled gastropods of the eastern Pacific from central Baja, California, to Arctic Alaska, is being continued by 30+ worldwide specialists and will be edited by Daniel Geiger (Santa Barbara Museum of Natural History), Jann Vendetti (NHMLAC Malacology), and yours truly. Jim was a devout liberal, a Rolling Stones fan, and collected succulents from all over the world. This year the Western Society of Malacologists commemorates its 50th anniversary and will be held, very appropriately, in Los Angeles at the Natural History Museum of LA County and the University of Southern California with Jann Vendetti as President. Remembrances for Jim (Past WSM president 1974) and Bill Emerson (past WSM president, 1969) will be included. Donations may be made to the James H. McLean Student Grant in Collections-Based Research, see http://westernsocietymalacology.org/grants/james-h-mclean-student-grant-in-collections-based-research/ for details. I will always be grateful to Jim as he hired me in 1988 to fulfill a NSF grant and I'm still here nearly 29 years later. Thank you Jim! Aloha.

Doreen Mahany Pragel, 84, of Calabash, N.C., passed away on Thursday, Nov. 3, 2016. Born on Dec. 5, 1931, in Caribou, Maine, she was the daughter of Ellery and Vivian Mahany. She was predeceased by her husband, Vincent Francis Pragel. Doreen was active at Saint Brendan's Catholic Church in Shallotte, N.C., and also with the North Carolina Shell Club. She was a retired registered nurse.

Peggy Atkins Wilkerson, 91, of New Bern passed away on September 21, 2016. A descendant of a pioneering Wake County, NC, family, she was one of nine children born to Margaret (Maggie) and Roger Merritt Atkins, of Holly Springs. She was preceded in death by her husband, C.W. (Bill) Wilkerson, in 1996; and by all her siblings: Robert, Anna Margaret, Percy, Elmo, Adelaide, Christeen, Charles and Adelle.

Peggy graduated from Fuquay Springs High School and Hardbarger's Business College. She retired from the United States Probation Office of the U.S. Courts. She was a devoted member of Centenary United Methodist Church, New Bern, and served as a volunteer in the church library. A charter member of the North Carolina Shell Club, Peggy will be remembered for sharing her seashells with many school children. She will also be remembered for sharing her Christmas poem passed down by her mother for many generations.

Freda Willis (1946-2016)

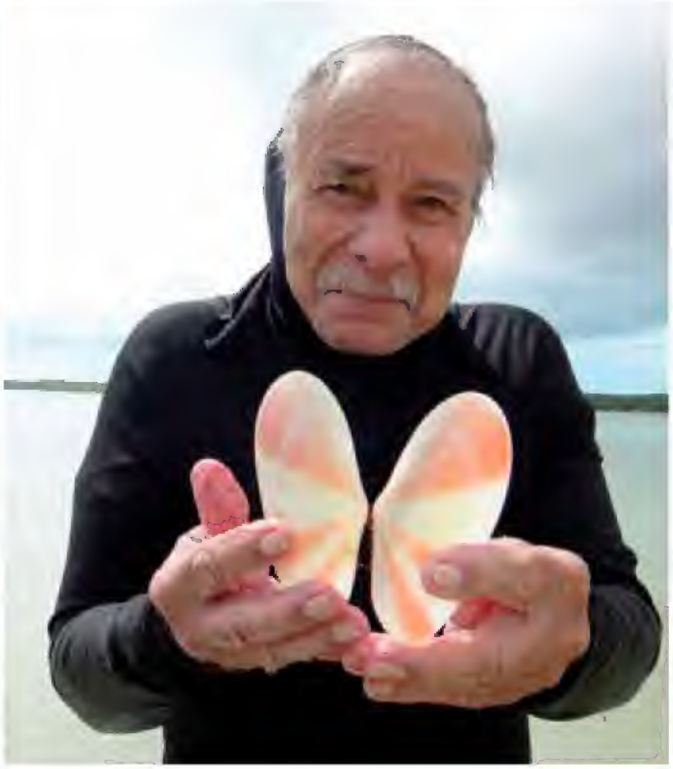
It is hard to decide what was more captivating, Freda's beautiful smile or her wonderful English accent. If you ever bought a T-shirt at a Sanibel Shell Show, you probably bought it from Freda. She helped sell them for years. No one could fold a T-shirt quicker or neater. Freda died on June 10th after a hard-fought battle with pancreatic cancer. She passed away at home with husband Dick and her son by her side.

Sanibel-Captiva Shell Club Gives $27,000 in Grants

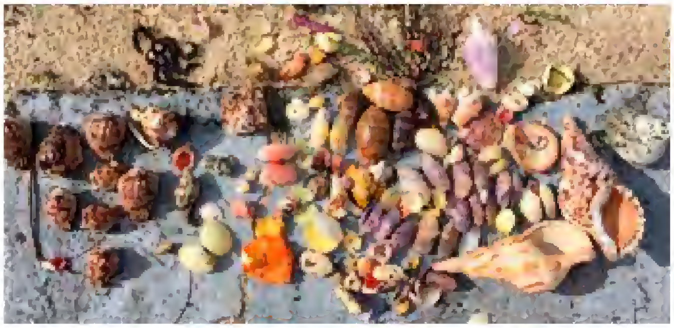
Each fall the Sanibel-Captiva Shell Club gives away all the profits from our March Sanibel Shell Show. This year the Club will distribute grants in the amount of $27,000.00, which is $2,000.00 more than last year and $5,000.00 more than the year before. The recipients of this year's grants are as follows:

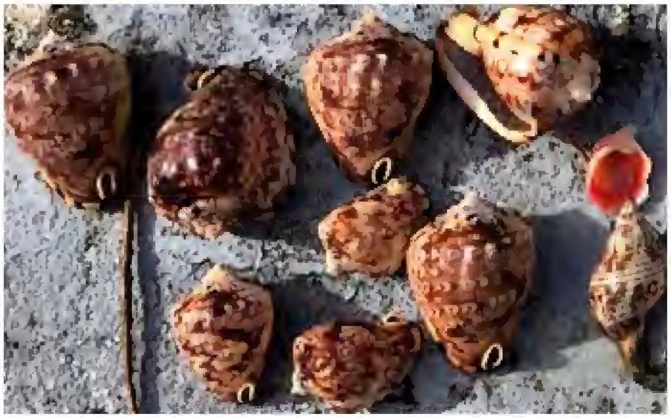
- Bailey-Matthews National Shell Museum $ 6,000.00
- Sanibel-Captiva Conservation Foundation $ 2,000.00
- Mote Marine Laboratory $ 1,000.00
- Adopt-A-Class (Bailey-Matthews National Shell Museum) $ 2,000.00
- Florida Gulf Coast University, Dept. of Marine & Ecological Science $ 5,000.00
- Conchologists of America Scholarship Program $ 1,000.00
- Sanibel Community House $10,000.00

Each year the Club also awards the "The Sanibel-Captiva Shell Club/Mary & Al Bridell Memorial Fellowship in Marine Science" to a graduate student at the University of South Florida. This year that scholarship was in the amount of $12,500.00 The Club started supporting graduate students at the university in 1982. In 1992 they joined hands with club members Mary & Al Bridell to establish the Memorial Fellowship. It is now self-sustaining. The 2015-2016 fellowship was awarded to Kaitlyn Colna. She is a Master of Science student majoring in Biological Oceanography. [From *The Junonia*, October 2016, the newsletter of the Sanibel-Captiva Shell Club, Inc.]



In the "just for the heck of it" file, here is COA member Jim Cordy with a 109 mm *Tellina radiata* Linnaeus, 1758, found on Millars Beach, Bahamas. While not quite a record size, it is certainly impressive. Apparently a bit of stormy weather washed up quite a few shells. Below is some of the beach wrack, plus a closer view of the helmets. Photos courtesy of Ellen Bulger.





The following is a letter from the COA board sent to 40 individual legislators, as well as the applicable agencies and subcommittees, concerning recent proposed changes to the regulations regarding the importation of species protected under the CITES (Convention on International Trade in Endangered Wild Species of Flora and Fauna) of 1973 and the F&W's own ECOS (Environmental Conservation Online System).

CONCHOLOGISTS OF AMERICA, INC.

Board of Directors
4132 Ortega Forest Drive
Jacksonville, FL 32210-5813

xx August, 2016

To: 40 legislators, subcommittees, and agencies (individually)

RE: Declaration for Importation or Exportation of Fish or Wildlife, 50 CFR 14.6114.64 and 14.94. OMB Control Number 1018-0012. <https://www.fws.gov/policy/library/2016/2016-09952.html>

Dear Sirs;

We are making this submission on behalf of the members of the Conchologists of America (COA), an organization devoted to the interests of shell collectors, to the esthetic and scientific aspects of conchology, and to the responsible collecting and preservation of mollusks (see **APPENDIX**). Founded in 1972, the COA has over 1000 members, mostly in the USA; publishes a quarterly, *American Conchologist*, probably the most widely-read journal dedicated to conchology; and hosts an annual convention attended by an average of 250 individuals. Its members and constituent shell clubs throughout the country provide educational outreach to their communities, contribute to the scientific record through activities such as field work, expositions, lectures, museum exhibits, and writing for a host of popular and scientific publications.

For these reasons we wish to call to your attention a problem of major concern to our membership and to the much larger community of thousands of seashell collectors throughout the United States and the world.

The United States Fish and Wildlife Service is currently in the process of promulgating regulations regarding the importation of species protected under the CITES (Convention on International Trade in Endangered Wild Species of Flora and Fauna) of 1973 and the F&W's own ECOS (Environmental Conservation Online System). Between the two they list 141 molluscan species under protection. Of these, 131 are indigenous to the United States (virtually all of which are either terrestrial or freshwater species), and 10 are from outside our country.

COA is incorporated under Section 202 of the Non-For-Profit Corporation Law of the State of Florida and is tax-exempt under the provisions of Article 501(c) 3 of the United States I.R.S. (Tax ID 112541695).

While the COA is on record as recognizing the need to protect these species, the structure of these regulations is such that absolute enforcement will greatly cripple amateur shell collecting in the United States and severely limit the access provided by amateurs and dealers to specimens and information vital to the research efforts of professional malacologists. More so than in other natural science realms, the amateur-professional relationship is tightly integrated and has existed for centuries. Shell clubs maintain lists of species in their area and provide materials from and information on the local habitat to the scientific community. Many amateurs participate in the seminars and conferences hosted by the professionals. Quite often you will find amateurs doing research in the same labs as the professionals. In turn the professionals and dealers are members of the local clubs and especially the COA.

The exact problem relates primarily to the USFWS requirement for a detailed species list and inventory of all collected materials to be submitted 48 hours prior to arrival in the U.S. Amateur collectors go on overseas shelling ventures and vacations that may last for one to two weeks, with daily collecting throughout. While these amateurs may conscientiously avoid collection of those species that are protected, it is virtually impossible to properly identify all species that are collected under field conditions. It is only after final cleaning and careful taxonomic research with identification guides and reference materials that such a detailed species list becomes possible.

We recognize and appreciate the incredibly difficult duty of the FWS inspectors who must make important on-the-spot decisions to allow or disallow entry and do so based on imperfect knowledge. With an estimated 100,000 species of mollusks, however, we contend that it is an unnecessary burden on the individual collector to prepare such a list, and further that it is both impractical and unnecessary for the USFWS to collect this detailed taxonomic information from individual collectors and small-business shell dealers on every incoming shipment involving low volumes of low-value, non-federally protected species of mollusk shells.

What we would like to see in the new regulations is a permitting process through which an individual collector could certify (either in advance of a trip or upon re-entry into the U.S.) that all materials to be collected and returned to the U.S. are nonliving and not subject to regulation under any existing U.S. or international law (in particular the Endangered Species Act and the Convention on International Trade in Endangered Species of Wild Fauna and Flora). Exempting the shells of non-protected mollusk species from the detailed listing requirement would greatly reduce the burden on both the collector and the FWS inspectors. Inspections could then be focused more sharply on those few species that are protected under law, and still permit collectors and dealers to bring in limited numbers of non-protected species for scientific study and display.

Sincerely yours,

The COA Board of Directors:

President: Harry G. Lee, MD, FLS, 4132 Ortega Forest Drive, Jacksonville, FL 32210-5813; (904) 389 4049
Vice President: Wayne Humbird, Lake Jackson, TX
Secretary: Phyllis Gray, Orlando, FL
Treasurer: Steven Coker, Clute, TX
Immediate Past President: José H. Leal, PhD, Sanibel, FL
Trustee: Everett Long, Swansboro, NC
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Convention Coordinator: Anne Joffe, Sanibel, FL
Board Member At Large: Jim Brunner, Panama City, FL
Board Member At Large: Douglas Wolfe, PhD, Beaufort, NC
Board Member At Large: Ed Shuller, Apex, NC

(**APPENDIX** follows)

APPENDIX

- In 1995 COA adopted a conservation resolution: "Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats."
- COA website: < http://www.conchologistsofamerica.org/home/>. The landing page includes documentation of COA's Tax-exempt status under the provisions of Article 501 (c) (3) of the IRS Code, our Constitution (including its corporate status in FL), and our By-Laws.
- *American Conchologist* recent issues 2010-2012 (twelve numbers) are posted at: <http://www.conchologistsofamerica.org/publications/table.asp>.
- The COA Collector's Code of Ethics is posted at <http://www.conchologistsofamerica.org/conservation/ethics.asp>.
- The COA resolution on conservation of mollusks is posted at <http://www.conchologistsofamerica.org/conservation/resolution.asp>.

* * * * *

Because of the number and complexity of the rules and regulations, promulgated by international organizations and individual countries, to identify and protect endangered species, it is understandable that an organization or individual would experience difficulty interpreting, much less adhering to these rules. As members of the COA we must be particularly cognizant of, and attentive to, ongoing conservation efforts and regulations that bear on the collection, possession, transport, export, and import of shells. In view of this, the COA will publish (2017) a supplement to *American Conchologist* titled: ***A Review of National and International Regulations Concerned with Collection, Importation and Exportation of Shells (Mollusca)***. Authored by COA members Douglas A. Wolfe and Harry G. Lee, this publication will present applicable (published) regulations and procedures, and the concomitant dilemmas, faced by the American conchologist who collects shells while traveling abroad and wishes to bring them back to the United States for personal use and study. The primary aims of this publication are: 1) to identify the species of mollusks that are protected under national and international law, 2) to inform and educate the shell-collecting public on the complex and difficult responsibilities and procedures of regulatory agencies charged with enforcement of the protective measures, and 3) to critique those same protective measures and procedures as they apply to mollusk shells — with a view toward potential simplification and improved regulatory efficiency. The authors fully realize that this publication cannot possibly contain all published species lists and restrictions and that it will be superseded by updates and changes made by organizations and individual countries. Insofar as possible, however, this publication should provide an aide in understanding the different regulations and a codification of the majority of presently restricted species of Mollusca. All listed species cannot possibly be presented, but the majority that the collector may come in contact with are listed and the numbers (if not the names) of restricted species by country are listed. Investigation by individual collectors of a specific country's restrictions is critical if collecting activities are planned for that country.

A SHELL COLLECTOR´S NIGHTMARE

Marcus Coltro

Years ago we were informed by inspectors of the US Fish and Wildlife Service (FWS) at the Miami International Airport that we would need a permit to bring shells into the US. So we went to their Atlanta office and got an import/export permit that we have since always presented to Customs when bringing shells into the US.

For years we have paid for the permit annually, and we thought that was all we needed until I arrived in Miami in August 2015. The FWS inspector said I should have filled an online form and paid an inspection fee 48 hours prior of my arrival – I explained that no one explained this when we went to Atlanta, but the agent took all my shells away to inspect. I called later that day and they requested a full list to check if I had anything listed on CITES. I sent them the list by e-mail and waited more than 15 days until I was summoned to meet the inspector responsible for my case, who's name I'll withhold for now, from the FWS office in Miami.

She took all that time to read every single label on my shells to see if I had any protected species. She did not find any but she said she could not return them to me since I did not have a permit from Brazil, where I came from. I was surprised to learn that she used Google to translate a page from IBAMA (Brazilian equivalent to F&W) to decide whether I needed an export permit or not. I inquired if she contacted IBAMA in person to come to that conclusion and she said that all she needed was on the ordinance she found on IBAMA's webpage. This subject has been a drawn-out affair and we have not yet come to viable resolution.

Weeks later I sent her several questions to see how to legally proceed from now on, for collectors and dealers' sake. To make it short, this is what can be understood from her reply. (I can send by e-mail the full message in case anyone would like to read it.)

- **If you are entering the US with shells you must fill eDec form 3-177 (available on edecs.fws.gov), pay the inspection fee of $93.00 and provide a full list of shells 48 hours prior arriving at any port;**
- **If you go on a shelling trip abroad you must do the same as above, but you do not need to pay the fee if you do not intend to sell the shells;**
- **Every red list or international regulation can be checked for protected species (it is up to you to find it out which one could be used in your case);**
- **They can keep your shells for as long as needed to inspect them, it can take several days or even weeks as happened to me;**
- **If you send or receive any parcel from abroad you will have to follow the same procedures mentioned in the first item (meaning, if you are a dealer you will have to pay the 93.00 fee even if you are just sending a 20.00 shell).**

These laws must be followed by everyone, not just dealers. If you have recently received or sent parcels without problems – you got lucky and the postal service may not have been looking for shells on every single parcel that day.

At first it seems not too complicated to follow these procedures, but it can be if you intend to exchange and/or buy shells frequently, since it will depend upon each individual inspector's decision whether to have your shells released or seized. Foreign dealers coming for a shell show cannot arrive 15 days before the show to give inspectors time to go through every single specimen. Not to mention how much work a US dealer should have and how much money they would spend to ship several international parcels per month.

One must understand these laws are not recent – a similar situation occurred in 1996 and was described in an article written by Gary Rosenberg. Back then nothing was done to change it. This time I have tried to contact as many dealers and collectors as possible to come up with a solution as I do not feel comfortable relying on luck. Amazingly, the reply (when I got one) was a suggestion to "let it go and wait until all this passes." Others implied I just did not want to pay the inspection fee, which is not the case – my concern is not the fee, but the time it can take for FWS to process all shells and which red list will be used. I know by heart all shells listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), but I am not familiar with locally protected shells from Timbuktu, for example.

I told all this to my late friend Steve Setzer from Arizona, and he said in his case it was even worse; he almost got arrested. He purchased an old collection that had several *Achatinella* from Hawaii. He was not sure if he could sell those in the US, so he called several FWS offices to know how to proceed. No one seemed to know until one of the inspectors started to exchange e-mails with him. After some weeks, a couple officers came to Steve's home and said they would have to confiscate all shells and they would give him a huge fine for having those shells in his possession. After some talk they lowered the fine to US$500 and took away all the shells. Do you know what happened to those important specimens collected in the early

1900s? They were glued on cardboard and given to kids in local primary schools. We can say it was not a good purpose for such material, right?

What to do? We must have a special permit created! We should not fight the inspectors since they are simply following the laws by the book. We need to change these laws in our favor and get a permit to prevent this situation from reoccurring. Years ago in Australia they were able to gather all collectors and come up with a permit.

We must prove that we are not the bad guys and that the number of collectors and dealer is so small that it makes no sense to force us all to go through all this bureaucracy and be treated as if we were importing container-loads of craft shells.

We must show them our side and hope to be able to make some changes on the law:

- We have no use for hundreds of specimens of the same species, since there are just a few collectors interested on buying or trading. It is not like collectors and dealers trade in hundreds or thousands of shells.
- Shell collecting is an individual labor, no one is able to collect enough specimens when snorkeling or diving to deplete a local population.
- For collectors abroad it is very difficult to clean shells. Time is short, only a few specimens can be collected and processed.
- We do not always find perfect or adult specimens – defective or juveniles are of no interest and are left where they are found.
- If we get shells from fisherman, it is because they get them as fishery bycatch, with maybe few exceptions in the Philippines, Indonesia, and other places where fisherman can survive by collecting shells (but mostly used for shell craft, not specimen shells).
- If the main reason is to prevent protected species from being traded, then FWS must have in mind that there are few species listed in CITES (which is the major resource to be checked. It makes no sense to verify every single shell in a quest for something that isn't there.
- Many shells on the market nowadays are "recycled" specimens from old collections, which method places no stress on living biota.
- In the US there are just a few active shell clubs – and several are ending because younger generations have other interests nowadays.
- Usually scientific shell collections end up in a museum, and some such collections, based largely on imported specimens, formed the basis of the world's finest natural history museums.
- Many new species have been found and described by collectors, who, in turn, obtained their material from overseas collecting or otherwise via importation.

Our shellers' universe is small and it is getting smaller due to draconian collecting restrictions. The authorities must understand we collectors and dealers are an indispensable source of information driving the science of malacology. Shell collectors and dealers invest time and money, not always available for researchers – and we have the most important factor that moves our hobby: passion.

Many species are very hard to obtain in their natural habitat; some landsnails and freshwater mollusks are extinct and are only known thanks to shell collectors. For example, we have had specimens collected in the 19th century in downtown Rio de Janeiro, and obviously those shells do not live there anymore. I have been to places in the Caribbean and collected species of *Cerion* in areas of real estate development that completely destroyed all the snails' habitat – those shells, exported and imported by me, are now in several collections, including the Smithsonian.

In the past, people collecting plants and animals in nature, often in exotic places, were called naturalists. Nowadays they run the risk of being called smugglers or wanton anti-environmentalists. If we do not act now, future generations will only be able to see these magnificent creatures in museums. If you know any congressmen, now is the time to ask for their help.

There is no way to preserve wildlife without knowing exactly what one is protecting.

Rosenberg, G. 1996. Conchatenations Notice of seizure. *American Conchologist* 24(4): December

Citizen scientists converge on Wilmington, North Carolina

John Timmerman, Chair North Carolina Shell Show

Cape Fear Museum in Wilmington North Carolina hosted the 41st North Carolina Shell Show on September 17 -18, 2016. The show featured exhibits by citizen scientists hailing from Florida, Kentucky, Kansas, New Jersey, and many points in between. Over 380 feet of high quality scientific exhibits and artwork graced the show.

One goal of the Shell Show committee is advertising the show. Billboards were designed for the show by our hosting institution. I had several promotional interviews including one by Gina Gambony for "Commuique" a locally produced feature which airs on the National Public Radio affiliate WHQR, 91.3 FM. One of our exhibitors, Phyllis Gray, heard the interview when she was in town for the show and suggested that the transcript be shared with the "American Conchologists" readers.

This interview between John Timmerman (North Carolina Shell Club) and Gina Gambony (WHQR) aired on WHQR Public Radio on September 17, 2016. The audio, plus an additional segment about an exhibit by Timmerman, is available at WHQR.org.

Gina (GG), inquired as to how many shells could be expected to be on view at the North Carolina Shell Show and John (JT), answered;

JT: I can't give an exact number. I think a safe bet would be tens of thousands.

GG: That's tens of thousands of shells he's talking about. The kind from the ocean. John Timmerman from the North Carolina Shell Club has loved sea shells since he was a child. He's the chair of the shell show exhibit at the Cape Fear Museum just this weekend. Here's more from John Timmerman about shells.

JT: North Carolina was the first really exciting shelling that I did when I was a child. My parents discovered Ocracoke back when it was much more 'wildernessy' than it is today. It was the mid '60s. The Bonner Bridge was brand new. The village had rolling black-outs back then, but the shelling was unbelievable.

GG: What can people expect to see in the Shell Show?

JT: The Shell Show is an interesting animal in that exhibitors from all over the country bring prepared exhibits about any theme they desire to profile. For instance, we have a lady coming from Kansas with an exhibit of shells from New Zealand. We have another man who has traveled the world his whole life. He's from Kentucky, bringing an exhibit of all the places he's gone over the world. We have a local man who goes to all the local islands and he's bringing a big collection of all North Carolina shells that he's picked up on beaches.

Shell Shows are competitive — we have awards that encourage professional quality. Important to science is keeping track of where the shell came from. If you don't know where the shell came from, it's worthless to scientists. Many of these awards are sponsored by institutions that are friends to museums, because amateur collectors are crucial to these museums that just don't have money to have people in the field all the time. So they encourage us and teach us to be good citizen scientists by these awards. They're essentially having us produce stuff that they will want in their collections one day.

For the public, you don't have to be into museum quality to really get into the Shell Show. We have all levels of people in the club, from your average weekend warrior that likes picking up pretty shells, to people that can speak enough Latin to put you to sleep. And at the show we have exhibits all the way from that. The man who's bringing his shells from NC, they're all shells he's found strictly on beaches; he doesn't ever take a live shell. It's all stuff that if you go to a North Carolina beach, you have a chance of finding. You don't have to know how to scuba dive and go to great depths offshore to find these shells.

GG: You said that he doesn't pick up living shells, is there an ethic about that?

JT: There's an ethic that all the shell collectors abide by. Even ones who take live shells, we do it very conservatively. That is to say, when you go to a flat, if you find one of something crawling around, you say well, there aren't a lot of them around here, you turn it loose. If you find a bucket of them, you look through it really carefully and keep one or two and put all the others back where [and] the way [you] found them. For example, if you find a shell under rocks and you decide you don't want it, you don't just toss it back into the water. You go find a rock and let it go under the rock because that's where it's used to living. Because we want to continue this and if you take all the shells you find, pretty soon you're not going to find any shells [be]cause they're all gone.

GG: But no need to worry, thanks to successful shell husbandry, there will be tens of thousands of shells at the shell show just this weekend at the Cape Fear Museum. That was the chair of the show, John Timmerman. Visit WHQR.org to see some of his photos.

North Carolina Shell Show Billboard, designed and distributed by New Hanover County (North Carolina) Public Affairs.

This and other publicity efforts did the job. The public arrived in droves. We had people waiting in line to be admitted to the show on both Saturday and Sunday.

This was the third year of a scavenger hunt, a very popular activity. For the first two years we provided stand-alone clues. This year we embedded the clues within exhibits in the show. People young and old enthusiastically completed the hunt. Upon completion they shared their results with our facilitators who invited them to select a prized shell.

The "People's Choice Award" went by overwhelming majority to Dr. Brady Semmel for his large collection of self-collected North Carolina shells. Brady specializes in collecting only shells that are dead. This has not hindered him in assembling a huge collection of beautifully documented shells displayed with photographic images. His exhibit provided a successful connection to many of our visitors.

Exhibitors contributed displays of shells and art spanning the globe to the pleasure of the public. Gene Everson's immense collection of self-collected shells wowed

Birthday partygoers show off prized shells after completing the scavenger hunt. The group came to the shell show as a departure from the usual amusement park activity. Photograph by Vicky Wall.

"Greetings From the Beaches of North Carolina," by Brady Semmel. A young show attendee uses Brady Semmel's exhibit to identify a shell he just found at the Shell Giveaway. Photograph by Karlynn Morgan.

Hand-carved and decorated shell jewelry inspired by traditional Native American designs, made by Bennie Pokemire. Photograph by Karlynn Morgan.

everyone. It was hard for me to pick a favorite, but a *Tutufa bardeyi* (Jousseaume, 1881), stood out as it is a personal favorite and super difficult to obtain from any source! Amy Dick brought a collection of mollusks collected from deep ocean hydrothermal vents providing many of us the first time ever chance to view these unique organisms. Jim and Linda Brunner's exhibit on the Philippine tangle net collecting of shells showed how the shells with the data description "tangle nets" that many of us are familiar with are caught. Karen Couch brought a beautiful exhibit of New Zealand shells, including many I had never seen. Bill Bennight's large collection of self-collected *Spondylus varius* G.B. Sowerby I, 1827, included one valve with a yellow hinge and the other hinge was rose. The shell earned him "Best Self-collected Shell (of The Show)." Doug Wolfe's exhibit of Peter Dance's 50 rare shells included at least one of each of the species profiled in the book, demonstrating Doug's resourceful collecting prowess. Doug's geoduck collection included a huge Mediterranean species contending as one of the largest bivalves in the show. Phyllis Gray shared with us a collection of shells featuring red and gold color. Gregory Curry brought a case of "to die for" fossil *Voluta* from Australia. In addition to his volute fossils, Greg also displayed a modern shell, *Tenebrincola cukri* (Rokop, 1972), which earned the title "Best Shell In Show." Ron Hill featured yet another of his shells few of us have ever seen, *Austroharpa loisae* Rehder, 1973, and featured an exhibit profiling his experience at teaching elementary students about shells at a science fair in April 2016. Vicky Wall profiled The Golden Guide "Seashells of the World." Her exhibit touted it as "the best shell book ever published." I am sure many may dispute the claim, but as the first shell book I ever owned it certainly provided many hours of enjoyment and would get my vote. Ed Shuller and Jeannette Tysor profiled malacologists who described shells found in North Carolina. Their display was supported with a large collection of self-collected shells.

Our artists continue to produce stunning work inspired by the world's shells. Irmgard Cate for a couple years now has said, "This is the last show I will enter..." and then returns. This year she took home the top awards for "Craft Using Shells" for her miniature shell designs using actual pocket watches and the "Sailor's Valentine."

The shell dealers not only provide great opportunities for the collectors to add shells to their collections but are more than willing to share their knowledge with the public about the shell world and information about specific shells. Their gallery is always an exciting destination for the show goers, both newcomers and established experts. It is a "candy store" for shell lovers.

A popular feature of the show for many years is the shell giveaway. Show visitors are invited to select one shell that is their prize from large trays of shells club members and friends of the shell club have donated. Our facilitators help them identify their finds and teach a few things about the shell's natural history. The giveaway provides a taste of the adventure awaiting those who go into the field.

Gene Everson won the COA Award for his display of worldwide self-collected shells. The display took 24 cases spread over 48 feet and contained highlights of Gene's lifetime collecting efforts around the world.

Jeannette Tysor & Ed Shuller were awarded the DuPont Trophy for "Malacologists Important in Describing NC Marine Mollusks." They also won the Alta Van Landingham Trophy for Best Self-Collected Exhibit.

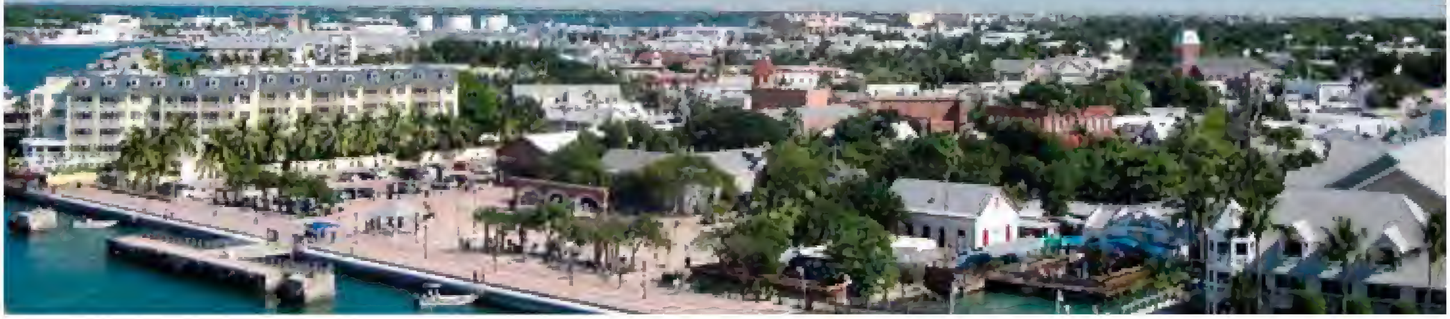
Going into the field, smelling marsh gas, getting one's feet wet, discovering the wonders of nature we call shells, starts many on the road to better understanding the earth's environments in a direct personal sense compared to one that can be abstract if only experienced by reading books or looking at the Internet. The North Carolina Shell Show provides a portal into the adventure in the study of mollusks. It inspires people who take away new energy encouraging the growth of existing and new citizen scientists.

John Timmerman

2017 COA CONVENTION

Ed Shuller

Key West, Florida
August 15 - 19



In 2017 the Conchologists of America will revisit the site of one of its earliest conventions.

Just the name Key West brings to mind images of palm trees and cool drinks, fantastic fishing and diving, great weather and beautiful scenery and sunsets. The ghosts of legendary figures such as Ernest Hemingway, Tennessee Williams, and Harry Truman are always near.

Key West's many distinct customs and cultures are a reflection of the island's rich mix of ethnicities, intertwining social classes, and accompanying diverse "life-styles." Since the early 1800s, through an ongoing process of nurturing, preserving, and blending together on a speck of an island situated 150 miles out to sea and just 90 miles from Cuba, Key West culture and customs have peculiarly evolved.

In the 19th Century, most of the residents settling on the island were former British loyalist immigrants moving from the nearby Bahamas, Cubans who arrived in increasing numbers after 1830, and African Americans fleeing slavery in the southern states. Some of these newcomers joined the sponging and turtle industries while many others worked in the very lucrative cigar manufacturing industry. Fortunes were made in rum running and salvaging.

Through these trades the island became one of the richest cities in the U.S. – both financially and culturally. During this time a large collection of some of the most charming wooden Victorian architecture in the world was built and still stands today as part of the historic district of Key West. Today fishing is still an important local industry, treasure hunters continue to scour the sea bottom for ancient galleons lost at sea, and you can still find tiny open-air "mom and pop" cigar stores owned and operated by Cuban cigar rollers.

By the mid 20th Century, Key West was attracting some of the more famous intelligent and creative minds of the time, such as Henry Flagler, Harry S. Truman, Ernest Hemmingway, and Tennessee Williams - setting a precedent for an ongoing influx of remarkable individuals and intriguing characters seeking a more independent and artistic life-style. With more bars and more churches per capita than anywhere else in North America, the 1970s and 1980s attracted a whole new wave of creative free-thinkers with the arrival of literary groups, actors, musicians, treasure hunters, artists, designers, photographers, film makers, entrepreneurs, trades people, sailors, philanthropists, self-proclaimed "pirates" and members of the hippie "counter-culture," openly gay and lesbian people from every walk of life, and expatriates, most of whom flawlessly blended into the tiny existing community of local Conchs, Cubans, and African Americans. From thence forward the tropical island of Key West has morphed into an intriguing microcosm and one of the most interesting places to live and a unique tourist destinations in the U.S.A.

The Key West Shipwreck Museum

A popular landmark due to its central location and its prominent lookout tower, which stands 65 feet above the city with unobstructed views of all Key West. The museum itself tells the story of the "wreckers" who once made their living recovering the cargo from shipwrecks (and saving the lives of sailors along the way). Actors interpret the exhibits, which includes treasure from the 1856 wreck of the *Issac Allerton*.

The Little White House

U.S. President Harry S. Truman used this former Navy officer's home as his winter White House for eight years during his presidency, spending almost half a year in Key West. Other presidents have also visited, most recently Bill Clinton in 2005. Located at 111 Front St., the Truman Little White House was built in 1890 as Key West grew in importance as a Navy base. Thomas Edison spent some time here, as well. Tours are offered every 15-20 minutes and cover the Truman years as well as the naval history of Key West, which not only includes a prominent role in the Spanish-American War, but also as an early submarine base active in the First and Second World Wars.

Mallory Square

Home to the most famous celebration of the setting sun in the U.S., maybe the world. Each evening before dusk, thousands of visitors (and street performers, and vendors) gather on the Key West waterfront to raise a toast as the sun slowly falls toward the horizon, usually with a variety of picturesque sailboats in the foreground. Afterwards, the crowds tend to filter off into the local shops and restaurants, which include a cigar factory, shell warehouse, and sponge market housed in old warehouse buildings.

Key West Aquarium

Located on Mallory Square in downtown Key West, the aquarium offers guided tours through a series of exhibits that include a touch tank, alligators and jellyfish, and hand-feeding of stingrays and sharks. Or, you can just wander the exhibits on your own. It's a nice way to spend an hour in Key West.

Duval Street

You can't visit Key West without strolling along Duval Street, which is home to many of Old Town's famous bars, restaurants, shops, bed & breakfasts, and historic sites. This long, straight main street runs from the Gulf of Mexico to the Atlantic Ocean, with the Southernmost House on one end and Mallory Square at the other. Duval Street is the address for watering holes like Sloppy Joe's, Captain Tony's, the Bull and Whistle, and the original Margaritaville. A feast for the eyes almost any time, Duval Street really comes to life at night when it's jammed with revelers hopping from bar to bar.

National Key Deer Refuge, Big Pine Key

About 800 diminutive Key Deer, a stunted subspecies of white-tailed deer, inhabit the National Key Deer Refuge on Big Pine Key. This is an 84,000 acre wildlife refuge that includes forest, wetlands, and other wilderness biotypes. Visitors can hike nature trails and observe the deer and other wildlife, including those inhabiting the Blue Hole, a flooded former quarry, near the park's visitor center.

All of these places are included in pre-Convention tours but that's not all you can expect – there's lots to do in Old Key West.

Make your reservations at the Convention hotel today.

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Free shuttle to downtown Key West
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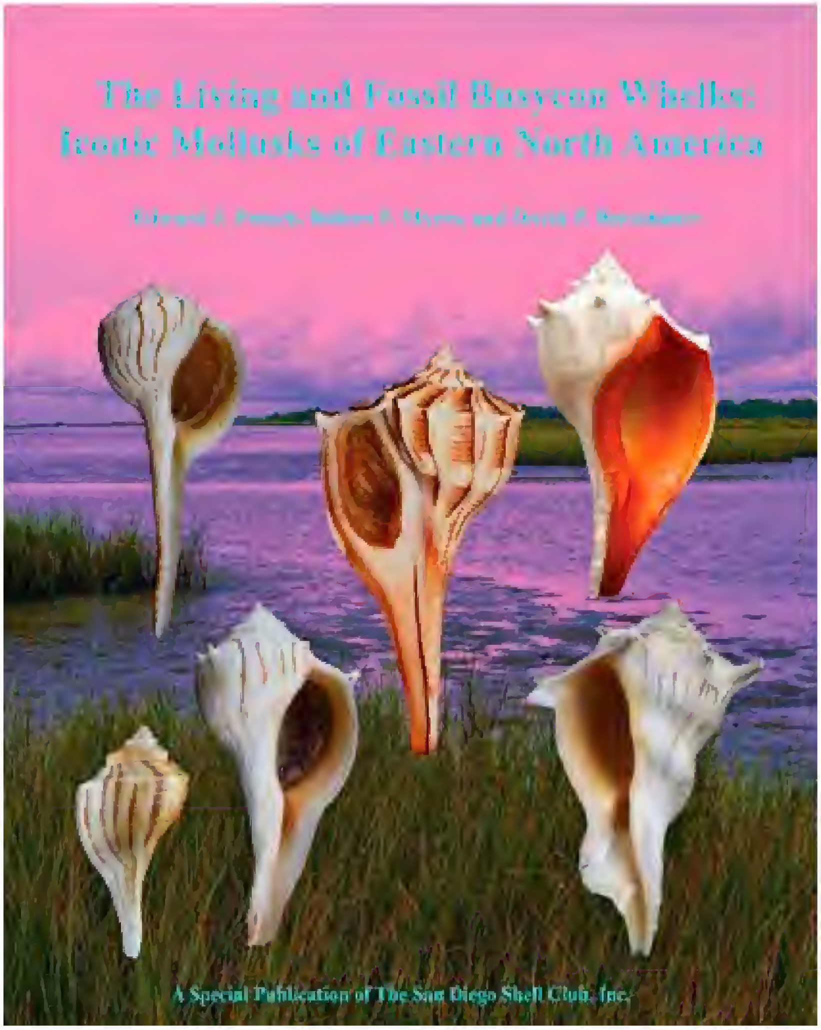
And lots of old friends and perhaps some new friends. This is the COA premiere event of the year – you really do not want to miss out.

The living and fossil Busycon whelks: Iconic mollusks of eastern North America

San Diego Shell Club, viii + 195 pp. By Edward J. Petuch, Robert F. Myers & David P. Berschauer, 2015. Spiral bound (if any remain): $80.00 plus 8% tax and shipping; hardcover: $100.00 plus 8% tax and shipping. Available from http://www.sandiegoshellclub.com/store/


The Living and Fossil Busycon Whelks:
Iconic Mollusks of Eastern North America
Edward J. Petuch, Robert F. Myers and David P. Berschauer
A Special Publication of The San Diego Shell Club, Inc.

This book fully unravels the *Busycon* whelks with up-to-date information and full page color plates. These iconic American mollusks, even though conspicuous and relatively common along eastern North America, have until now a confusing history of classification and taxonomic nomenclature with placement in four different families at different times. This book hopefully settles this past confusion.

The color plates are exact to the species color. Easy to read with details on evolution, histories, and map localities, making it a great visual guide. Well organized alphabetical listing of genus and species. No flipping back and forth of pages trying to match names and images. The book contains over 120 color plates and maps, with pictures of these fascinating shells. Each section also includes photos of variant species.

Seventeen (17) Recent species are treated, including: *Busycon carica*, *B. eliceans*, *Sinistrofulgur sinstrum*, *S. laeostomum*, *S. pulleyi*, *S. perversum*, *Lindafulgur candelabrum*, *L. lyonsi*, *Busycoarctum coarctatum*, *Busycotypus canaliculatus*, *Fulguropsis spiratus*, *F. rachelcarsonae*, *F. keysensis*, *F. pyruloides*, *F. plagosus*, *F. plagosus galvestonensis*, *F. texanus*. Sixteen (16) species are found in eastern US coastal waters and one species is endemic to the Yucatan Peninsula, Mexico. In 1938 *Busycotypus canaliculatus* (the channeled whelk) was introduced by accident to the San Francisco Bay area, but is seemingly restricted to that area due to the cold waters of the Pacific. The details presented in this book give it a no-nonsense approach and I found it an reference.

Also included in this book is a 'Living *Busycon* & Fossil/Paleontology' information source that takes the reader to the fossil progenitors (over 100 species) of the *Busycon* whelks. Photos are provided for each species. Great for identification and comparison for the fossil hunter and shell collector.

Habitat ecology and feeding strategies are also included, with explanations of such strategies as engulfing and "edge chipping," and a listing of favorite foods and principal food sources with preferred habitat descriptions and photos of the different species in their natural habitats. Very helpful in the field.

I found this book to be an excellent reference guide with detailed descriptions and exact color photos. Bringing together fossil and living *Busycon* whelks in one source makes this an invaluable book for the collector. This is a special publication of The San Diego Shell Club, Inc.

Tammy L. Myers

American Conchologist
Calendar membership (Jan - Dec) = $25 (USA)
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